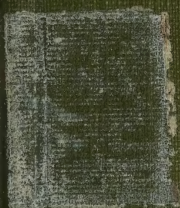


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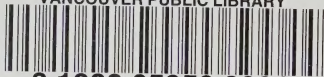
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Flora of Southern British Columbia

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FLORA
OF
SOUTHERN BRITISH COLUMBIA
AND VANCOUVER ISLAND

WITH MANY REFERENCES TO ALASKA
AND NORTHERN SPECIES

BY
JOSEPH KAYE HENRY



Prescribed for use in the Schools of British Columbia

QUATSINO SCHOOL
QUATSINO, B.C.

W. J. GAGE & CO., LIMITED
TORONTO

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PREFACE

The aim of this book is to give a brief description of the flowering plants, the ferns and their allies found in Southern British Columbia. Introduced plants that show some tendency to become a permanent part of our Flora are included along with the native plants. These constitute, in general, the ever-increasing species known as weeds, which reach our limits along the railways or in ballast. Interesting examples of such are the Red-Fruited Dandelion, which is now establishing itself at the Coast, as the Common Dandelion did 30 or 40 years ago; and Hemp Nettle (*Galeopsis Tetrahit*) which appeared in New Westminster recently, shortly after the arrival of a colony of French-Canadians at the Fraser River Mills.

To determine the plants of British Columbia is at present a task of considerable difficulty. No general herbarium has been established, and descriptions of plants are scattered through many books and scientific publications. To make these descriptions available for the amateur, rather than to attempt an authoritative survey of our Flora, the materials for which, indeed, have not yet been assembled in British Columbia, is the general aim of the book.

The region covered is mainly the Southern part of the province extending from Vancouver Island to the Rockies, with a rather indefinite northern limit, to about the Skeena. As, however, many northern plants have been described, and as southern plants extend far northwards in the Coast region, and Alaskan plants far southward in the mountains, it is hoped that the book will be found of very considerable service in the north.

The botanical areas included may be arranged somewhat as follows: (1) The rather dry southern part of Vancouver Island with the Oak as its characteristic tree; (2) The Coast Forest Region, characterized by the Douglas Fir, the Sitka Spruce, the Broad-leaved Maple; (3) The Dry Interior, including the region of the Western Yellow Pine, shading into the more or less distinct treeless bunch-grass plains and hills; (4) The humid forest region of the interior, marked by the Western Larch, the Lodge Pole Pine, and farther north by the Black and the White Spruce; (5) The subalpine region where the Firs (*A. amabilis* and *A. lasiocarpa*), Engelmann's Spruce and the Black Hemlock (*T. Mertensiana*) flourish; (6) The Alpine or Arctic region above the tree line, the vegetation of which corresponds in part with that of the far north.

While the aim of the writer has not been eclectic, he is far from confident that he has included all the plants in the region covered. Of some omissions he is quite aware and suspects that there are many others. The scarcity of herbarium material makes the descriptions in many cases less authoritative than is desirable; for, though there has been much collecting done in British Columbia, collectors have in general taken their material away with them. The collection of Mr. J. R. Anderson has been of considerable assistance. The kindness of Mr. Eli Wilson, B.A., and Mr. A. J. Hill, M.A., has helped me over many difficulties. Through the courtesy of Dr. C. F. Newcombe, I have had opportunities of examining several northern species. Mr. John Davidson, F.L.S., of the Government Botanical Office has enabled me to include descriptions of several plants not hitherto listed. Miss Alice Eastwood, Profs. Brainerd, Macbride, Nelson, Rowlee and Weigand have determined various specimens for me. Above all, I gratefully acknowledge the kindness of the Botanical Staff of the Geological Survey, Ottawa, extending back to the days twenty-one years ago when I first became acquainted with our so varied and attractive wild flowers.

Assistance has been very freely taken from many sources. The basis of the book is Macoun's Catalogue. Very free use has been made of Howell's Flora of North West America, Piper's Flora of Washington, Coulter and Nelson's Flora of the Rocky Mountains, Frye and Riggs' Northwestern Flora, Gray's New Manual, etc. Students who desire illustrations will find photographic representations of many of our most striking mountain plants in Mrs. Henshaw's "Mountain Wild Flowers," and in Brown and Schaffer's "Alpine Flora of the Canadian Rockies."

In the matter of classification I have in general, as far as Genera are concerned, followed the conservative tendencies of Gray's New Manual; i.e., large groups are preferred to the minuter classification of the North-American Flora. Thus *Potentilla*, here regarded as a single genus, is in the latter work sub-divided into half-a-dozen. As to what constitutes a species it is useless to look for uniformity. There will always be "lumpers" and "splitters." With the strong present tendency to multiply species, the writer does not sympathize. Here again Gray's New Manual sets a sane example. The same plan is followed to some extent by Coulter and Nelson, who have made a notable effort to control the growing tendency to sub-division by reducing many so-called species to synonyms. Dr. Fernald's treatment of *Brunella vulgaris*, in which slight variations are regarded as forming varieties and forms rather than independent species, may be cited as a model. To determine what constitutes a species is by no means easy. Thus at the Coast there are 3 well marked native Roses, each with many variations. It seems desirable to recognize these forms, yet if new species are proposed, they must, in the nature of things, be ill defined and quite unworthy to be placed in the same rank as the species from which they are separated. In such cases the treatment in some English Manuals seems preferable to the practice of many American botanists. Doubtless the "splitting" characteristic of the unprecedented activity in American Botany for the last twenty years will soon give place to the broader conception of what the "lumper" considers constitutes a species. This conclusion I have reached gradually during my work, and fear I have not quite freed myself from the prevailing tendency to sub-division.

A few words may be said regarding nomenclature. After many of the descriptions in this book a second and sometimes a third name may be found. These are called synonyms. Thus *Rubus nutkanus* Moc. after *R. parviflorus* Nutt. indicates that the Thimbleberry was first named by Thomas Nuttall, and that later Mocino, doubtless in ignorance that the plant already had a name, gave it another. In such cases evidently the earliest specific name should be maintained. But there are also synonyms of another kind. In the genus *Fragaria* *F. Helli* Holtz is given as a synonym of *F. bracteata* Heller. In this case there are two more or less distinct plants, but the characteristics which distinguish them are too slight to warrant their being considered really distinct species. Indeed, it is quite likely that *F. bracteata* might well be considered a synonym of the eastern *F. vesca* L., a plant first described by Linnaeus. Lastly, when, as not infrequently happens, two writers describe different plants under the same name, it becomes necessary to give one a new name, and to mention the original name as a synonym. Sometimes two authors are given with a species. Thus, if *Potentilla Multisecta* be regarded as a distinct species, the correct form taken by its name would be *P. multisecta* (S. Wats) Rydb., indicating that Sereno Watson first described the plant, and that Dr. P. A. Rydberg now gives it specific standing. The only specific names now capitalized are some old Linnean generic names still retained for species and those derived from the names of persons; e.g. *Lepidium Draba*; *Veronica americana*; *Salix Hookeriana*.

Many persons make more or less extensive collections of plants. Their first impulse is to get specimens of striking or rare plants, which they preserve in scrap books. It is much better to attach the plants to separate

sheets with glue or strips of gummed paper or sticking plaster, and to keep the sheets in portfolios. The collection may thus readily expand into an herbarium. The standard size of sheet is $10\frac{1}{2} \times 16\frac{3}{4}$ inches. If this is considered too large, sheets $9\frac{1}{2} \times 13$ will be found convenient. Collectors should remember that they cannot thoroughly know a species from a single specimen. Plants should be gathered at several dates to show both flowers and fruit, and taken from various habitats or localities in order to show the effect of environment. Not only should the finest specimens be taken, but average or even depauperate forms as well. The collector will often find much to interest him in making as complete a collection as possible of some one species in order to show how widely plants vary. He may then be able to draw up interesting and valuable analysis of species which he had at first thought unattractive. Victoria collectors will find attractive material in *Saxifraga integrifolia*; Vancouver collectors in *Rosa gymnocarpa*, or in making a series of specimens that shall show the complete life history of *Rubus spectabilis*, incidentally determining whether it is possible to distinguish in flower the two forms with yellow and with purple fruit. Collections fully representing the plants of a limited area (a farm, a sand-pit, a mountain-peak, etc.) or the plants belonging to a single Family or Genus, are always interesting. It is probable that most school collecting, apart from the formation of the school herbarium, should take such special lines, not only because it has high scientific and educational value, but also because indiscriminate collecting may well have a tendency to destroy attractive plants.

The botanical exploration of the province initiated by the Hon. H. E. Young, M.D., Minister of Education, is now well under way. It is hoped that this book may materially advance this work by assisting local collectors in the determination of their specimens. The book was originally suggested by Dr. Alexander Robinson, Superintendent of Education, who wished to place a Flora in our schools, not only for scientific purposes, but to introduce youth to one of the purer sources of enjoyment.

J. K. H.

Vancouver,
August 2nd, 1915.

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ABBREVIATIONS

<i>Am.</i> ,	America or American.
<i>B.C.</i>	British Columbia.
<i>cm.</i> ,	centimeter.
<i>Cal.</i> ,	California.
<i>Col.</i> ,	Colorado.
<i>D. I.</i> ,	Dry districts in the interior of B.C.
<i>dm.</i> ,	decimeter.
<i>eastw.</i> ,	eastward.
<i>Introd.</i> ,	introduced.
<i>m.</i> ,	meter.
<i>mm.</i> ,	millimeter.
<i>Mt., Mts.</i> ,	Mountain, Mountains.
<i>No.</i> ,	Number.
<i>northw.</i>	northward.
<i>N.A.</i> ,	North America.
<i>N.B.</i> ,	New Brunswick.
<i>southw.</i>	southward.
<i>Sask.</i> ,	Saskatchewan.
<i>Var.</i> ,	Variety.
<i>V. I.</i> ,	Vancouver Island.
<i>Wash., Wn.</i> ,	State of Washington.

THE METRIC SYSTEM

For botanical purposes the following measurements are sufficiently accurate.

1 mm. = $\frac{1}{25}$ inch, or hardly the thickness of a ten cent piece.

1 cm. = 10 mm.; 2.5 cm. = 1 inch. One cm. about equals the width of the tip of the little finger.

1 dm. = $\frac{1}{10}$ meter = (roughly) 4 inches, or about the width of the hand, with the thumb if the hand is small.

1 m. = 39 inches, about the length of a long pace.

ANALYTICAL KEY TO THE FAMILIES

DIVISION I.—PTERIDOPHYTA

Spore-producing plants without flowers.

Stems with many conspicuous sheathed nodes; the spores in a terminal cone-like spike	EQUISETACEÆ.	PAGE 8
Stems without sheathed nodes.		
Leaves narrow, long or short, sporangia axillary.		
Stem short, corm-like; leaves elongated	ISOETACEÆ	11
Stem usually long and creeping, leaves 2-6 mm. long.		
Sporangia bearing large and small spores	SELAGINELLACEÆ	10
Sporangia bearing spores of one kind	LYCOPODIACEÆ	11
Leaves (fronds) broad, sporangia not axillary (Ferns).		
Rootstocks almost wanting, sporangia coriaceous, ringless	OPHIOGLOSSACEÆ.	1
Rootstocks well developed; sporangia thin, with a ring of cells	POLYPODIACEÆ	2

DIVISION II.—SPERMATOPHYTA

Plants with true flowers containing stamens or carpels or both, reproduction by seeds.

SUBDIVISION I.—GYMNOSPERMÆ

Ovules on an open scale, not enclosed; trees and shrubs with needle-like leaves.

Flowers in catkin-like clusters; fruit a cone or berry-like and bluish	CONIFERÆ	13
Flowers solitary, axillary; fruit berry-like, red	TAXACEÆ	13

SUBDIVISION II.—ANGIOSPERMÆ

Ovules borne in a closed ovary.

CLASS I.—MONOCOTYLEDONS

Stems without central pith or annular layers, but having the woody fibres distributed throughout; embryo with a single cotyledon; parts of the flower usually in 3's or 6's, never in 5's; leaves mostly parallel-veined.

Plant consisting of an orbicular frond, floating freely in water, with no true leaves	LEMNACEÆ	74
Plants rooted in the ground.		
Perianth wanting or rudimentary, or of bristles or scales in a single series.		
Flowers enclosed or subtended by dry, chaffy scales.		
Stems round, hollow, leaf-sheaths split, anthers versatile.	GRAMINEÆ	23
Stems triangular, leaf-sheaths closed, anthers basifixed	CYPERACEÆ	52
Flowers not enclosed by dry, chaffy scales, though such may be found irregularly placed in the inflorescence.		
Plants growing near low-tide mark	NAJADACEÆ	18
Immersed aquatics growing in fresh or brackish water	NAJADACEÆ	18
Flowers perfect.		
Flowers monœcious or diœcious.		
Flowers in globose heads	SPARGANIACEÆ	17
Flowers axillary	NAJADACEÆ	18
Terrestrial or marsh plants.		
Leaves petioled, net-veined.	ARACEÆ	74
Leaves not petioled, parallel-veined.		
Flowers in large cylindrical spikes	TYPHACEÆ	17
Flowers in globose heads	SPARGANIACEÆ	17
Perianth in 2 series, petals and sepals present.		
Perianth small, chaffy, greenish or purple	JUNCACEÆ	75
Perianth herbaceous, petals and sepals alike or different.		
Perianth free from the ovary (ovary superior).		
Gynœcium of distinct carpels.		
Carpels 3	Scheuchzeria	
Carpels many	ALISMACEÆ	23
Gynœcium compound, carpels united.		
Carpels 3-6, slightly coherent, separating at maturity	JUNCAGINACEÆ	22
Carpels 3, coherent	LILIACEÆ	79
Perianth adherent to the ovary, which is thus altogether inferior.		
Flowers regular, stamens 3.	IRIDACEÆ	88
Flowers irregular, stamen 1	ORCHIDACEÆ	89

CLASS II.—DICOTYLEDONS

Wood forming between bark and pith in perennials a new layer each year; leaves net-veined; parts of the flower mostly in 4's or 5's; cotyledons 2.

Corolla wanting, calyx present or absent.

Flowers in catkins, moncecious or diceious.

Either the staminate or the pistillate flowers, but not both, in catkins.

Twining plants, the fertile flowers in a short catkin. *Humulus* 105

Not twining, the sterile flowers in catkins.

Fruit a nut

Both staminate and pistillate flowers in catkins. FAGACEÆ 104

Ovary a 1-celled pod, seeds comose. SALICACEÆ 95

Ovary not a pod, seeds not comose.

Calyx present URTICACEÆ 104

Calyx wanting, at least in the fertile flowers.

Leaves aromatic MYRICACEÆ 102

Leaves not aromatic BETULACEÆ 102

Flowers not in catkins.

Ovary or its cells 1-2 ovuled.

Carpels distinct.

Stamens inserted on the calyx ROSACEÆ 169

Stamens inserted on the receptacle RANUNCULACEÆ 129

Carpels 1, or, if more, united into a compound pistil.

Ovary superior, *i.e.*, free from the calyx.

Stipules sheathing the stem POLYGONACEÆ 106

Stipules none or not sheathing the stem.

Herbs.

Aquatic plants, styles 2 CALLITRICHACEÆ 200

Not aquatic.

Style 1 or wanting.

Flowers unisexual URTICACEÆ 104

Flowers perfect.

Style springing from near base of ovary

Style none or terminal.

Stigma tufted *Sanguisorba* 176

Stigma not tufted.

Stamens 2, 4 or 6 *Lepidium*, *Athysanus* 142, 144

Stamens 9 or more *Achlys* 139

Styles or stigmas 2 or 3

Juice milky EUPHORBIACEÆ 200

Juice not milky.

Flowers in involucrate heads *Eriogonum* 107

Flowers not involucrate.

Bracts scarious, plants not fleshy

Bracts none or foliaceous, plants

often fleshy CHENOPODIACEÆ 113

Shrubs or trees.

Heath-like, leaves linear EMPETRACEÆ 201

Not heath-like, leaves not linear.

Fruit berry-like RHAMNACEÆ 203

Fruit winged.

Fruit winged all round URTICACEÆ 104

Fruit a double samara ACERACEÆ 202

Ovary inferior, adnate to the calyx.

Parasitic plants LORANTHACEÆ 116

Not parasitic.

Aquatic herbs HALORAGIDACEÆ 211

Not aquatic.

Leaves scurfy ELÆAGNACEÆ 210

Leaves not scurfy

Leaves opposite, thick NYCTAGINACEÆ 117

Leaves alternate, thin SANTALACEÆ 106

Ovary or its cells many-ovuled.

Ovary superior, not adnate to the calyx.

Carpels distinct RANUNCULACEÆ 129

Carpels united into a compound pistil.

Calyx of separate sepals CARYOPHYLLACEÆ 117

Calyx 5-toothed *Glaux* 239

Ovary inferior, adnate to the calyx.

Leaves 4 cm. or more in breadth ARISTOLOCHIACEÆ 106

Leaves smaller.

Ovary 4-celled, stamens 4 *Ludvigia* 212

Ovary 1-celled, stamens 8-10 *Chrysoplenium* 160

Calyx and corolla both present.**COROLLA OF SEPARATE PETALS.**

Stamens more than 10, and more than twice as many as the petals.

Ovary superior, not adnate to the calyx.

Carpels several or many, distinct or slightly united at base.

Aquatic plants.

Leaves peltate, plants gelatinous

Brasenia 128

Leaves not peltate

RANUNCULACEÆ 129

Terrestrial.

Filaments united into a tube.

MALVACEÆ 204

Filaments not united.

Stamens inserted on the calyx

ROSACEÆ 169

Stamens not inserted on the calyx.

Stamens on an hypogynous disk

RESEDACEÆ 155

Stamens on the receptacle

RANUNCULACEÆ 129

Carpels 1 or, if more, united into a compound pistil.

Leaves punctate with translucent dots

HYPERICACEÆ 205

Leaves not punctate.

Ovary simple, 1-celled.

Ovules 2, seed 1, *Prunus* in

ROSACEÆ 169

Ovules many, *Actæa* in

RANUNCULACEÆ 129

Ovary compound, of several united carpels, as shown by the number of stigmas, styles, ovary cells, or placenta.

Ovary 1-celled.

Placenta parietal, juice often milky, sepals 2

PAPAVERACEÆ 139

Placenta central, juice watery, sepals 2

PORTULACACEÆ 125

Ovary several-celled.

Terrestrial, filaments united

MALVACEÆ 204

Aquatic, filaments not united

NYMPHACEÆ 128

Ovary compound, partly or quite inferior (*i.e.*, adnate to the calyx).

Stems very fleshy, leaves none

CACTACEÆ 210

Leaves present.

Sepals or calyx-lobes 2

PORTULACACEÆ 125

Sepals or calyx-lobes more than 2.

Leaves opposite

Philadelphus 160

Leaves alternate

ROSACEÆ 169

Stipules present

LOASACEÆ 209

Stipules absent, plants spiculate-pubescent

Stamens not more than twice as many as the petals.

Stamens of the same number as the petals and opposite them.

Anthers opening by valves

BERBERIDACEÆ 139

Anthers not opening by valves.

Sepals or calyx-lobes 2

PORTULACACEÆ 125

Sepals or calyx-lobes more than 2.

Style and stigma 1; herbs

PRIMULACEÆ 235

Styles or stigmas 2 to 4; trees or shrubs

RHAMNACEÆ 203

Styles or stigmas 5; herbs

PLUMBAGINACEÆ 235

Stamens not the same in number as the petals, or, if the same in number, alternate with these.

Ovary superior—*i.e.*, free from the calyx.

Ovary deeply lobed or the carpels distinct with stigma or style in common.

Anthers or pollen masses united to a thick stigma

ASCLEPIADACEÆ 242

Anthers free from each other and from the stigma.

Stamens inserted on the receptacle.

Carpels with separate styles or stigmas

RANUNCULACEÆ 129

Carpels with a style or stigma in common.

Ovary 2-4-lobed, flowers whitish

LIMNANTHACEÆ 199

Ovary 5-lobed, flowers red or white

GERANIACEÆ 198

Stamens inserted on the calyx or on a perigynous disk.

Stamens twice as many as the carpels, plants usually fleshy

CRASSULACEÆ 156

Stamens not twice as many as the carpels.

Stipules present

ROSACEÆ 169

Stipules wanting

SAXIFRAGACEÆ 157

Ovary simple or of united carpels.

Ovary simple, 1-celled, 1 placenta

LEGUMINOSÆ 184

Ovary compound, as shown by the 2 or more cells, placenta, styles or stigmas.

Ovary 1-celled.

ANALYTICAL KEY TO THE FAMILIES

	PAGE
Corolla irregular.	
Petals 4, stamens 6	FUMARIACEÆ 140
Petals and stamens 5	VIOLACEÆ 206
Corolla regular or nearly so.	
Shrubs.	
Ovule 1.	ANACARDIACEÆ 201
Ovules more than 1	SAXIFRAGACEÆ 157
Herbs, ovules more than 1.	
Stamens 6, tetradynamous	CRUCIFERÆ 141
Stamens equal, or more than 6.	
Leaves beset with gland-tipped hairs	DROSERACEÆ 155
Leaves not so beset.	
Ovules at the centre or bottom of the ovary.	
Petals not inserted on the calyx	CARYOPHYLLACEÆ 117
Petals on the throat of the calyx	LYTHRACEÆ 210
Ovules on 2 parietal placentæ of the 1-celled, stipitate ovary	CAPPARIDACEÆ 155
Ovary 2-several-celled.	
Flowers irregular; herbs	BALSAMINACEÆ 203
Flowers regular.	
Stamens neither just as many nor twice as many as the petals.	
Trees or shrubs	ACERACEÆ 202
Herbs, petals 4, stamens 6	CRUCIFERÆ 141
Stamens just as many or twice as many as the petals.	
Ovules and seeds 1 or 2 in each cell.	
Herbs.	
Cells of the ovary as many as the sepals.	
Ovary 2-4-celled, flowers whitish	LIMNANTHACEÆ 199
Ovary 5-celled, flowers red or white	GERANIACEÆ 198
Cells of the ovary twice as many as the sepals, flowers usually blue in ours	LINACEÆ 197
Shrubs or trees.	
Low, leaves evergreen	CELASTRACEÆ 202
Tall, leaves deciduous	ACERACEÆ 202
Ovules and seeds several to many in each cell.	
Green leaves wanting	MONOTROPACEÆ 234
Green leaves present.	
Style 1	ERICACEÆ 226
Styles 2-5	CARYOPHYLLACEÆ 117
Ovary inferior, at least on its lower half.	
Ovules and seeds more than 1 in each cell.	
Ovary 1-celled.	
Sepals 2, placentation central	PORTULACACEÆ 125
Sepals 4-5, placentæ 2-3, fruit a berry	SAXIFRAGACEÆ 157
Ovary 2-many-celled.	
Style 1, stamens 4 or 8	ONAGRACEÆ 211
Styles 2 or 3, stamens 5 or 10	SAXIFRAGACEÆ 157
Ovules and seeds 1 in each cell.	
Shrubs.	
Leaves not prickly.	
Leaves alternate, stipulate	<i>Crataegus</i> 182
Leaves opposite, exstipulate	CORNACEÆ 226
Leaves prickly	<i>Fatsia</i> 225
Herbs	
Stamens 5 or 10.	
Fruit dry, splitting into two parts at maturity, styles 2	UMBELLIFERÆ 216
Fruit berry-like, styles 2-5	ARALIACEÆ 225
Stamens 4 or 8	
Style and stigma 1, fruit a drupe	CORNACEÆ 226
Fruit not a drupe, leaves often whorled	HALORAGIDACEÆ 211
COROLLA OF MORE OR LESS UNITED PETALS.	
Stamens more numerous than the lobes of the corolla.	
Ovary 1 celled.	
Placentæ 1, stamens 10	LEGUMINOSÆ 184
Placentæ 2, stamens 6	FUMARIACEÆ 140
Ovary more than 1-celled.	
Green leaves wanting	MONOTROPACEÆ 234
Green leaves present.	
Filaments united	MALVACEÆ 204
Filaments not united	
Shrubby, leaves simple	ERICACEÆ 226
Herbaceous, lower leaves ternate	<i>Adoxa</i> 279
Stamens not more numerous than the corolla lobes.	
Stamens of the same number as the corolla lobes, and opposite them; ovary 1-celled, placentation central.	PRIMULACEÆ 235

Stamens alternate with the corolla lobes or fewer; ovary or placentation otherwise.

Ovary superior, *i.e.*, free from the calyx.

Corolla regular.

Stamens as many as the corolla lobes.

Carpels more or less distinct.

Carpels 2, distinct below, stigmas united.

Stamens united ASCLEPIADACEÆ 242

Stamens distinct APOCYNACEÆ 242

Carpels 4 (apparently), ovary deeply 4-lobed.

Leaves alternate, stigma 1 BORAGINACEÆ 249

Leaves opposite, stigmas 2 LABIATÆ 256

Carpels united into a compound ovary, or ovary not lobed.

Ovary 1-celled.

Leaves entire, opposite GENTIANACEÆ 239

Leaves either not entire or alternate.

Leaves with 3 entire leaflets, or 1 dm. *Menyanthes* 241

broad, reniform, crenate HYDROPHYLLACEÆ 247

Leaves otherwise

Ovary 2-10-celled.

Twining or trailing.

Leafless parasites *Cuscuta* 243

Leafy, not parasitic.

Fruit a berry.

Corolla plaited in the bud, upper

leaves lobed *Solanum* 261

Corolla not plaited, leaves not lobed ERICACEÆ 226

Fruit a capsule CONVULVULACEÆ 243

Not twining nor trailing.

Stamens nearly or quite free from the

corolla, opening by pores; mostly

shrubby plants ERICACEÆ 226

Stamens inserted in the corolla; herbs.

Stamens 4.

Stem with opposite leaves, corolla

petaloid. VERBENACEÆ 255

Stemless; corolla scarious PLANTAGINACEÆ 276

Stamens 5.

Fruit of 2 or 4 seed-like nutlets. BORAGINACEÆ 249

Fruit a capsule or berry.

Style and stigma 1; fruit a berry or

prickly capsule SOLANACEÆ 261

Fruit a capsule, not prickly.

Stigma 1 or 2, style often divided HYDROPHYLLACEÆ 247

Stigmas 3, style undivided. POLEMONIACEÆ 244

Stamens fewer than the lobes of the corolla.

Stamens with anthers 4. VERBENACEÆ 255

Stamens with anthers 2.

Ovary 4-lobed. *Lycopus*. 259

Ovary not 4-lobed *Veronica* 266

Corolla irregular.

Stamens with anthers 10 *Rhododendron* 234

Stamens with anthers 5 *Verbascum* 262

Stamens with anthers 2 or 4.

Ovules solitary in the 1-4 cells.

Ovary 4-lobed, the style rising from between

the lobes LABIATÆ 256

Ovary not lobed, style from apex VERBENACEÆ 255

Ovules 2 to many in each cell.

Parasites, without green leaves OROBANCHACEÆ 274

Not parasitic.

Ovary 1-celled, stamens 2 LENTIBULARIACEÆ 275

Ovary 2-celled SCROPHULARIACEÆ 262

Ovary inferior, *i.e.*, adherent to the calyx-tube.

Plants with tendrils CUCURBITACEÆ 282

Plants without tendrils.

Stamens separate.

Stamens free from the corolla or nearly so, as

many as its lobes; juice milky CAMPANULACEÆ 283

Stamens inserted on the corolla.

Stamens 1-3, fewer than the corolla-lobes VALERIANACEÆ 281

Stamens 4-5, leaves opposite or whorled.

Leaves opposite or perfoliate, exstipulate. CAPRIFOLIACEÆ 278

Leaves either opposite and stipulate or

whorled RUBIACEÆ 277

Stamens united by their anthers.

Flowers separate, not involucrate LOBELIACEÆ 284

Flowers in an involucrate head COMPOSITÆ 284

FLORA OF
SOUTHERN BRITISH COLUMBIA

FLORA OF SOUTHERN BRITISH COLUMBIA

OPHIOGLOSSACEÆ (ADDER'S TONGUE FAMILY)

Fern-like in appearance with simple or dissected fronds; rootstock almost none, the fronds arising almost directly from a cluster of fleshy roots (in our only genus); fronds erect in veneration, developing from underground buds formed either inside the old stalk or beside it; the fertile frond differing in appearance from the sterile, forming spikes or panicles; sporangia coriaceous, bivalvular (opening by a slit) ringless; prothallus subterranean, not green.

BOTRYCHIUM (GRAPE FERN. MOONWORT)

Rootstock short, erect, with clustered fleshy roots, the bud for next year's frond embedded in the base of the stalk; the frond with sterile and fertile segments; the sterile segments 1-3 pinnate; the fertile bearing naked sporangia in 2 rows. (Name from Gk. *botrys*, a bunch of grapes, from the appearance of the clustered sporangia).

Sterile segment of frond thin; base of stalk open along one side	1. <i>B. virginianum</i>
Sterile segment of frond thick; base of stalk closed.	
Sterile segment of frond long-petioled	2. <i>B. silaifolium</i>
Sterile segment sessile or the petiole less than 1 cm. long	
Sterile segment oblong.	
Leaf-segments fan-shaped	3. <i>B. lunaria</i> .
Leaf-segments ovate to obovate or oblong.	
The segments approximate, fertile frond slightly compound or simple	
The segments more remote, fertile frond rather ample	4. <i>B. simplex</i> .
Sterile segment ovate or triangular.	5. <i>B. ramosum</i> .
Lobes lanceolate, acute	6. <i>B. lanceolatum</i>
Lobes oblong-ovate, obtuse	5. <i>B. ramosum</i> .

1. ***B. virginianum*** (L) Sw. (RATTLESNAKE FERN). Rather slender, 1-5 dm. high, the sterile segments 1-2 dm. broad, sessile above the middle of the plant, triangular, often broader than long, ternate, the primary divisions 1-2 pinnate, the ultimate segments acute. Rich Woods. Fraser Valley; Revelstoke, and eastw.

2. ***B. silaifolium*** Presl. Stout, 2-5 dm. high; sterile segment usually solitary, arising from near the base of the plant on a petiole 5-15 cm. long, and exceeded by the fertile part, broadly ovate or triangular, ternate, the primary divisions 1-2-pinnate, the ultimate segments oval or ovate, more or less crenulate, usually obtuse. Dry woods, V. I.; Fraser Valley; Dewdney Trail. (*B. occidentale* Underw.)

3. ***B. lunaria*** (L) Sw. Fleshy, 0.5-3 dm. high; sterile segment nearly sessile, borne about the middle of the plant, simply pinnate, the 4-16 divisions lunate or fan-shaped, crenate or entire, overlapping or distant, the veins radiating from the base, and forking; the fertile segment 2-3 pinnate. Woods and open places, Alaska southward to Wn.

4. ***B. simplex*** E. Hitchcock. Plant 0.5-1.5 dm. high; the sterile segment short-petioled from near base, middle or summit of stalk, simple and roundish or oblong and entire to deeply 3-7-pinnatifid; the lobes round-obovate, decurrent on the broad rachis; the fertile segment simple or compound, sometimes reduced to a few sporangia. Inconspicuous; grassy meadows, Rockies.

5. **B. ramosum** (Roth.) Ascher. Low, 1-2 dm. high; the sterile segment nearly sessile at or near the top of the long, slender, common stalk, varying from pinnate to pinnatifid, the lobes oblong-ovate or obovate, the midvein disappearing into forking veinlets; the fertile part 2-3-pinnate, often much-branched. Alaska to Wn. and eastw; Agassiz (*B. neglectum*).

6. **B. lanceolatum** var. **angustisegmentum** Pease and Moore. Rather low, 1-2.5 dm. high; the sterile segment sessile near the top of the stalk, 4-6 cm. broad, and about as long, the 3 primary segments 1-2-pinnatifid, the ultimate lobes acutish; the veinlets forking from a continuous midrib; the fertile part 2-3-pinnate. Alaska to Wn.; Elgin.

POLYPODIACEAE (FERN FAMILY)

Leafy plants with erect or often elongated rhizomes; veneration circinate; the leaves (*fronds*) bearing spores in spore-cases (*sporangia*) opening transversely, and collected in dots or lines (*sori* or fruit dots) on the back or margins; the sori often covered (at least when young) by a membrane (*indusium*); prothallus green, sporangia thin, provided with a ring of cells.

Sterile and fertile fronds clearly different, the pinnæ of the fertile frond much contracted.

Fertile frond bipinnate 1. *Cryptogramma*.

Fertile frond simply pinnate.

Margin of fertile pinnæ strongly revolute, indusium obscure 2. *Onoclea*.

Margin of fertile pinnæ not revolute, indusium a continuous intra-marginal band 3. *Struthiopteris*.

Fronds either all fertile or the sterile and fertile not very different.

Indusium wanting, the sori naked.

Fronds simply pinnate or pinnatifid 4. *Polypodium*.

Fronds 2-4-pinnate or pinnatifid.

Fronds silvery beneath 5. *Gymnogramme*.

Fronds green on both sides 6. *Phegopteris*.

Indusium present at least in young plants.

Indusium formed by the more or less modified revolute margin of the fronds; sori marginal.

Sori distinct from each other, the revolute margin not continuous. 7. *Adiantum*.

Sori soon confluent under the continuously revolute margin.

Stalks stout, solitary 8. *Pteris*.

Stalks slender, clustered.

Fronds pubescent or tomentose beneath 9. *Cheilanthes*.

Fronds glabrous 10. *Pellaea*.

Indusium not formed by the revolute margin.

Sori or some of them elongated.

Sori parallel to the midrib 11. *Woodwardia*.

Sori parallel to the lateral veins 12. *Asplenium*.

Sori round or reniform.

Indusium superior.

Indusium peltate, evident.

Indusium without a sinus, fronds rather coriaceous 13. *Polystichum*.

Indusium with a sinus, fronds membranous 14. *Aspidium*.

Indusium attached at one side, soon withering 15. *Cystopteris*.

Indusium inferior (cuplike), fringed or often not evident 16. *Woodsia*.

1. CRYPTOGRAMMA (ROCK BRAKE)

Fertile and sterile fronds markedly dissimilar, the fertile pinnæ much narrower than those of the sterile, both membranous; the indusium consisting of the scarcely modified revolute margins; low, tufted, 2-3-pinnate ferns, the segments sessile, sporangia pediceled, sori extending down the veins.

1. **C. acrostichoides** R. Br. (PARSLEY F.) Tufted; fertile fronds taller than the sterile, their segments many, linear, 8-12 mm. long; the segments of the 3-4-pinnatifid sterile fronds ovate-oblong, serrulate, firm; stipes straw-colored, scaly at base. Dry rocky hillsides. Common. Nootka; Alaska and eastw.

2. **C. Stelleri** (Gmel.) Prantl. Stems slender, scattered, from creeping slender root-stocks; fertile fronds taller than the sterile, their pinnæ cut to the rachis in few-lobed or entire segments; sterile fronds thin, flaccid, 2-3-pinnatifid, the pinnæ pinnate or pinnatifid, their segments ovate to obovate, crenulate, decurrent at their bases; stipes dark brown, scaly below. Crevices of wet rocks, Rockies; not common.

2. ONOCLEA

Tall ferns; the fertile fronds very different from the sterile, erect, rigid, with contracted pod-like or berry-like divisions at first concealing the sporangia; sporangia on elevated receptacles, the sori imperfectly covered by delicate hood-like indusia, rootstocks creeping.

1. **O. struthiopteris** (L.) Hoffm (OSTRICH FERN). Tufted; the sterile fronds short-stalked, 6-10 dm. high, broadly oblanceolate, narrowed towards the base; pinnæ many, oblong-lanceolate; 1-pinnatifid, the segments oblong, entire or nearly so, their veinlets simple, free; fertile fronds shorter, the pinnæ with strongly revolute margins becoming pod- or necklace-like. Agassiz; Gold Range.

3. STRUTHIOPTERIS (DEER FERN)

Fronds of 2 kinds, the fertile with narrower pinnæ and taller, both simply-pinnate or pinnatifid; sori in a continuous band next the midrib, covered by a continuous membranous indusium which is intra-marginal (in ours).

1. **S. spicant** (L.) Scop. Tufted, 3-6 dm. high; sterile fronds lanceolate, tapering to both ends, 4-8 cm. wide, nearly sessile, cut to the rachis into entire oblong-falcate segments, the lowest mere auricles; fertile fronds taller, long-stalked, pinnate, the pinnæ not so closely set below as in the sterile. (*Lomaria*). Damp woods west of the Coast Range, and V.I. Var. **crenata** (Presl.) Larger; pinnæ acute, crenate, the lower deflexed, ear-shaped. V.I.

4. POLYPODIUM (POLYPODY)

Rootstocks creeping, knotted; sori large, round, naked, in one or more rows on each side of the midrib, borne on the ends of free veinlets. (Gk. *poly*, many, and *pous*, a foot, alluding to the branching root-stock).

1. **P. vulgare** L. Rootstocks clothed with brown chaffy scales; fronds 1-3 dm. high, deeply lobed nearly to the rachis, glabrous; veins free; the lobes short, oblong, obtuse, slightly toothed; sori round or somewhat oblong, on the upper half, about half way between midrib and margin. Often on mossy trees and logs. Common, Alaska to Oregon (*P. hesperium*).

Var. **occidentale** (Hook). Fronds longer, pinnæ longer, serrate with a tapering point. The common form at the Coast. (*P. falcatum*).

2. **P. Scouleri** H. & G. Rootstock stout, scaly; fronds very thick and leathery, 1-4 dm. long, 0.5-1.5 dm. broad; veins forming ample regular areolæ; pinnæ blunt, sori very large. West Coast; V. I. and northward.

5. GYMNOGRAMME

Low, tufted ferns with black shining stipes (in ours); sori oblong or linear, following the veins, and like them, simple forked pinnate or branching, without indusia.

1. **G. triangularis** Kaulf (SILVER-BACK F.) Tufted, 1-3 dm. high; fronds triangular, dark green above, silvery-mealy below; pinnate and then pinnatifid; the lowest pinnæ largest, with 2 long basal pinnules on the lower side, the ultimate lobes ovate-triangular entire. Dry rocky places, usually under the lee of boulders. Victoria; Gulf Islands; Nanaimo.

6. PHEGopteris (BEECH FERN)

Sori small, round, naked, borne near the margin on the back of the veins below its apex; stipe continuous with the root-stock; veins free in ours. (Greek *phegos*, a beech, *pteris*, a fern).

1. *P. alpestris* (Hoppe.) Mett. Plants densely tufted, the stipes with a few brown scales at base; fronds oblong-lanceolate, 4-8 dm. long; 1-2 dm. broad, glabrous, 3-pinnate, the lower pinnæ decreasing moderately and rather distant, the pinnules pinnatifid. Damp mountain slopes. Coast to the Selkirks.

2. *P. Dryopteris* (L.) Fee. (OAK FERN). Not tufted, plants with root-stocks; fronds ternate, triangular, 2-3 dm. high, usually broader than long, the 3 primary divisions ovate, 1-2 pinnate, the ultimate segments oblong, obtuse; rachis wingless. Woods, common; Alaska to Oregon.

3. *P. phegopteris* (L.) Underw. Not tufted, fronds pinnate, the pinnæ pinnatifid, longer than wide, triangular, 3-6 dm. long, hairy, the 2 basal pinnæ deflexed, the rachis winged above the 2 lower pinnæ. Rocky woods; "The Lions," Vancouver; Selkirks. (*P. polypodioides*).

7. ADIANTUM (MAIDENHAIR)

Fruit-dots marginal under the more or less modified margins of the frond; pinnules without a main rib; stipes black, shining. Name from two Gk. words meaning *unwetted*, the foliage repelling rain.

1. *A. pedatum* L. Frond, 2-5 dm. high, forking several times, pinnules very short-stalked, entire on the lower margin which may be considered as main rib, since the veins arise from it, cleft and spore-bearing on the other. Wet cliffs and banks. Common; Alaska to Quebec. Var. *aleuticum* Rup.: Pinnules with longer stalks and more deeply cleft into narrow-toothed lobes on the upper margin. Mt. Finlayson, V. I.; Southern B.C.

8. PTERIS (BRAKE)

Sporangia in a continuous line under the margin of the frond, and occupying a transverse vein-like receptacle which connects the tips of the free veins; in ours an obscure inner indusium extends beneath the young sporangia; fronds 3-pinnate. (Greek *pteris*, a fern).

1. *P. aquilina* L. var. *lanuginosa* Bong. Rootstocks thick, creeping; fronds 9-30 dm. high, tri-pinnate, the primary branches 2-pinnate, pinnules oblong-lanceolate, cut to the midrib, pubescent beneath. Common, V. I. to Rockies; Alaska. The roasted roots were eaten by the Indians.

9. CHEILANTHES (LIP-FERN)

Low, tufted ferns; sporangia on the ends of free veinlets, small, roundish, continuous, covered by the herbaceous margin of the 2-3-pinnate frond, which is tomentose on the lower surface; stipes dark brown.

1. *C. gracillima* D. C. Eaton. (LACE FERN). Fronds lanceolate, 0.5-2 dm. high, bipinnate; pinnæ numerous, crowded, pinnately divided into about 9 small, oblong-oval, mostly entire, pinnules, at first slightly webby above, soon smooth; tomentum beneath heavy, brown. Rocks; Saanich Arm; Harrison Lake; Spence's Bridge.

2. *C. Feei* Moore. Fronds ovate-lanceolate, 0.5-1 dm. high, tripinnate; pinnæ 9-16, deltoid below, oblong-ovate above, the lower distant; pinnules crenately pinnatifid or mostly divided into minute roundish crowded segments; tomentum whitish, becoming brown, the upper surface of the frond scantily tomentose. (*C. lanuginosa*). Cliffs, East of Cascades. Common.

10. PELLÆA (CLIFF BRAKE)

Fertile and sterile fronds not very different, both coriaceous; indusium consisting of the more or less modified, scarious margin; sporangia pediceled; sori at the ends of the veins, or in No. 1, extending down the veins; small ferns with 1-3-pinnate fronds, the segments petiolulate or articulated (except in No. 1), stipes dark brown, shining. (Whence the name, Gk. *pellos*, dusky).

1. **P. densa** (Brack.) Hook. Rootstock black, scaly; stipes tufted, wiry, 3-4 times longer than the ovate-oblong, densely 2-3-pinnate frond; the segments mucronate, sessile, linear-lanceolate, 6-12 mm. long; the sterile segment serrate. Rocky hills; V. I.; Yale; Arrowhead.

2. **P. occidentalis** (Nels.) Rydb. Rootstock short, densely red-scaly-tomentose; stipes tufted, slender, usually shorter than the frond; frond oblong, loosely 1-pinnate or the lower pinnæ pinnate or lobed; pinnæ few, oblong, obtuse, more or less clearly nerved; short stalked, 1.2-2 cm. long; the marginal indusium broad, not much modified. (*P. atropurpurea* in part). Summerland.

11. WOODWARDIA

Sterile and fertile fronds alike (in our species) fruit-dots oblong or linear, arranged in rows parallel to and near the midrib; indusium sub-coriaceous, fixed by its outer margin and open on the side next the midrib.

1. **W. spinulosa** Mart and Gal. Fronds pinnate, the pinnæ deeply pinnatifid, the lobes lanceolate, spinulose-serrulate, long—acuminate at apex; rachis somewhat chaffy. Mexico to B.C.; Texada Is.

12. ASPLENIUM (SPLEENWORT)

Sori oblong or linear, oblique, distinct from each other; indusium straight or curved, fixed by one edge. (The name alludes to supposed medicinal properties).

1. **A. trichomanes** L. Low, tufted, 1-2 dm. high; fronds linear-oblong, simple pinnate; pinnæ rigid, oblong 4-8 mm. long, sessile, entire or crenulate, stipe and rachis dark, shining. Rocky places, common; Alaska.

2. **A. viride** Huds. Low, tufted, 6-12 cm. high, fronds linear-oblong, simply pinnate, pinnæ softly herbaceous, roundish-ovate, crenate, somewhat cuneate at base; usually broader than long; short-stalked, stipe and rachis green, becoming dark. Mt. Cheam; Port Simpson; Rockies; Alaska.

3. **A. cyclosorum** Rupr. (LADY FERN). Tufted, 6-17 dm. high, stipes clothed below with brown scales; fronds 2-pinnate, broadly oblanceolate; the pinnæ gradually reduced towards the base, often very strongly ascending, often 3 dm. long, the pinnules serrate to pinnatifid; the indusia usually curved, some of them horse-shoe-shaped, and crossing the veinlet. (*A. Filix-fœmina* in part). Common; Alaska to Cal.

13. POLYSTICHUM

Fronds tufted, firm or coriaceous, evergreen, large, stipes chaffy; sori round, indusium pellate, attached by the middle and opening all round with no sinus.

Fronds simply pinnate.

Fronds scarcely stalked, linear-lanceolate
Fronds long-stalked, lanceolate
Pinnæ partly pinnatifid below, sori many
Fronds bipinnatifid or nearly bipinnate, sori few; fronds less than 1 dm. wide
Fronds large, fully bipinnate, more than 1 dm. wide

1. *P. lonchitis*.
2. *P. munitum*.
3. *P. scopulinum*.
4. *P. Lemmoni*.
5. *P. Braunii*

1. **P. lonchitis** (L.) Roth. (HOLLY F.) Fronds 1-5 dm. long, rigid, the stipes 3-7 cm. long; pinnæ 1-3 cm. long, acute, falcate above, strongly auricled at base on the upper side, the lowest shorter, triangular, all spinulose-serrate, with spreading weak bristles; sori continuous, midway between the margin and the midrib. Cascades, Rockies and Selkirks; Alaska.

2. **P. munitum** (Kaulf.) Underw. (SWORD F.) Rootstock stout; tufted; stipes very chaffy; the rachis brown-scaly; frond 0.5-1.5 dm. wide, with close sharply serrate spreading acute pinnæ, auricled above near the base, the serratures appressed-bristly; sori about midway between margin and midrib. Abundant in the Coast region; Alaska. (Var. *incisoserratum* D. C. Eaton). Var. *imbricans* D. C. Eaton. Fronds narrow, the pinnæ 2-3 cm. long, imbricated, the serratures ending in sharp points. Victoria.

3. **P. scopulinum** (D. C. Eaton) Maxon. Tufted, stipes 0.5-1.5 dm. long, with dense pale scales at base, small scattered scales on the rachis; fronds 1.5-2.5 dm. long, 3-5 cm. wide, pinnate, the pinnæ with usually 1 pair of pinnules at base, margin serrated with incurved teeth, apex obtuse; sori nearer the midrib than the margin, indusia large, somewhat lobed. Texada Island.

4. **P. Lemmoni** Underw. Tufted, stipes densely chaffy at base, with pale-brown scales, 0.5-1.5 dm. long, with scattered scales above, fronds 1.7-2.5 dm. long, 3-8 cm. broad, bipinnatifid or nearly bipinnate on the lower third; pinnæ close, ovate; pinnules 9-11, oval, obtuse, not armed; sori 1-2 to each pinnule. Alaska to Cal.

5. **P. Braunii** (Spenner) Lawson. Tufted, stipes chaffy; fronds lanceolate, 4-9 dm. long, with numerous, spreading oblong-lanceolate pinnæ, the lower gradually reduced and obtuse; pinnules ovate or oblong, truncate and almost rectangular at base, sharply toothed, beset with long soft chaffy hairs; rachis with light brown chaff. Rock crevices and rocky woods, Nootka, V. I.; Rockies, Lat. 52°.

6. **P. Andersoni** Hopkins. A new species. Strathcona Park.

14. ASPIDIUM (SHIELD FERN)

Fronds tufted, 1-3-pinnate, not coriaceous; sori round, borne on the back or rarely at the apex of the veins; indusium cordate-reniform, with a narrow sinus, but centrally attached. (*Dryopteris*). (Gk. *aspidion*, a small shield, from the shape of the indusium).

Fronds thin, veins simple or once-forked, lowest pinnæ reduced to mere lobes

Fronds firmer, veins forking freely, the lower pinnæ moderately or not at all reduced.

Pinnæ pinnatifid

Pinnæ pinnate or bipinnate.

Pinnæ pinnate, tapering from base to apex

Pinnæ bipinnate or tripinnate.

Fronds pale and more or less glandular beneath, indusium glandular

Fronds green beneath, not glandular, indusium usually not glandular

1. *A. oreopteris*.

2. *A. cristatum*.

3. *A. Filix-mas*.

4. *A. rigidum*.

5. *A. spinulosum*.

1. **A. oreopteris** Sw. Stipes short, scaly below; fronds 4-6 dm. long, broadly lanceolate, tapering below, glandular; pinnæ 5-8 cm. long, deeply pinnatifid, the lower slightly more distant; sori nearly marginal, indusia more or less toothed. Wet ground; Shawnigan; Port Simpson; Glacier; Alaska.

2. **A. cristatum** (L.) Sw. Fronds lanceolate, 3-6 dm. long; pinnæ 5-8 cm. long, triangular-oblong or the lowest triangular, deeply pinnatifid at least at the base, segments obtuse, finely serrate, the lower pinnæ broadest, and moderately reduced; sori midway between midrib and margin; indusium naked. The form assigned to this species has fronds rather paler beneath. Swamp, Clanwilliam; Rockies.

3. **A. Filix-mas** (L.) Sw. (MALE FERN). Frond lanceolate (3-11 dm. long), pinnæ narrowly lanceolate; pinnules oblong, obtuse, serrate at apex, distinct at base, confluent at apex of pinnæ; sori nearer the midvein than the margin, usually confined to the lower half of the pinnule. Near Revelstoke; Alaska.

4. **A. rigidum** Hoffm. Fronds paler and more or less glandular beneath, 3-6 dm. long, ovate-lanceolate, bipinnate, the segments spinulose-toothed; pinnæ oblong-lanceolate, the lowest broadest and scarcely shorter than the middle ones; indusia convex, the margin bearing short-stalked glands. Mt. Finlayson, V. I.

5. **A. spinulosum** Sw. var. *americanum* Fischer Stipes with a few pale deciduous scales; fronds ovate-lanceolate, bipinnate, the pinnæ oblique, elongate-triangular, the lower pairs broadly triangular, pinnules connected by a very narrow wing, spinulose toothed; indusia smooth, glandless. Alaska to N.S. The common form in southern B.C. is var. *dilatatum* (Hoffm.) Hook. Scales numerous, large, brown with a darker centre; fronds triangular-ovate, usually tri-pinnate, pinnules lance-oblong, the lowest, especially on the lowest pinnæ, elongated. Common; Vancouver; Alaska.

15. CYSTOPTERIS (BLADDER FERN)

Low, delicate ferns, fronds 2-3 pinnate, the lobes cut toothed; sori roundish on the back of the veins; indusium delicate, hood-like, attached by a broad base on one side, soon withering.

1. **C. fragilis** (L.) Bernh. Frond oblong lanceolate, 0.8-2 dm. long, 2-pinnate, the stipe almost as long, the pinnæ oblong-lanceolate, narrowly decurrent on the rachis; the lower pinnæ slightly reduced and somewhat distant, their pinnules less than 1 cm. long. Woods and hillsides, Atlantic to Pacific. Mt. Cheam; Okanagan Valley; Alaska. Variable in the cutting of the pinnules.

2. **C. montana** Bernh. Frond deltoid-ovate, 3-4-pinnate, 0.8-1.5 dm. broad, and about as long, the lowest pinnæ triangular-lanceolate and much the largest, their lowest pinnules 2-4 cm. long. Mossy banks and rocks; not common. Kicking Horse Pass; Alaska.

16. WOODSIA

Low, tufted, 1-pinnate and then pinnatifid; the lobes crenate; sori round, on the back of simply forked free veins; indusium delicate, soon withering, attached under the sporangia, either small and open, or early bursting at the top into irregular lobes or fringe.

Fronds chaffy, indusium divided into slender hairs curling over the sporangia

Fronds not chaffy, indusium concealed under the sporangia 1. *W. ilvensis*.
Fronds glabrous 2. *W. oregana*.
Fronds pubescent and glandular 3. *W. scopulina*.

1. **W. ilvensis** (L.) R. Br. Frond thickish, dark green, oblong-lanceolate, 1-1.5 dm. long, smoothish above, clothed with rusty chaff beneath; the pinnæ pinnatifid, the segments crenate. Rocks, Kootenay.

2. **W. oregana** D. C. Eaton. Fronds thin, the leaf 5-25 cm. long, light green, narrowly lance-oblong, 1-2.5 cm. wide, pinnæ triangular-oblong, obtuse, pinnatifid, the segments oblong or ovate, obtuse, crenate-serrulate, the teeth or margin usually reflexed, the lower somewhat remote; stems straw-colored. Yale to Rockies; Cowichan River, Alt. 4,000 ft.

3. **W. scopulina** D. C. Eaton. Similar; fronds glandular beneath and sometimes above, oblong-lanceolate, 1-4 cm. broad; the margins not reflexed; stems straw-colored or brown. Rocks, common east of the Cascades; also on V. I.; Alaska.

EQUISETACEÆ (HORSETAIL FAMILY)

Rush-like perennials with jointed, mostly hollow, stems, and long root-stocks; stems simple or branching, more or less grooved, with a double series of cavities, those under the grooves called vallicular holes, with which the stomata connect; branches, when present, whorled; nodes bearing sheaths of reduced leaves joined by their edges; fruit a terminal cone; sporangia discharging green spores, which are all alike and furnished with hygroscopic processes called elaters.

1. EQUISETUM

The only genus: characteristics above.

Stems annual; spikes rounded at the apex; stomata scattered.

Fertile stems pale or brown, earlier than the green sterile ones.

Fertile stems not branching.

Fertile stems slender, branches of sterile stems smoothish 1. *E. arvense*.
Fertile stems stout, branches of sterile stems rough 2. *E. telmateia*.

Fertile stems at length branching.

Branches simple 3. *E. pratense*.
Branches compound 4. *E. sylvaticum*.

Stems all alike, green, fruiting in summer.

Central cavity small, sheaths loose, stems slightly roughened
with cross banks of silex 5. *E. palustre*.

Central cavity large.

Vallicular holes present, sheaths loose 6. *E. litorale*.
Vallicular holes wanting, sheaths close, stems smooth 7. *E. fluviatile*.

Stems perennial, evergreen, spikes tipped with a rigid point, stomata in regular rows in the grooves.

Central cavity of stem wanting, stems filiform 8. *E. scirpoides*.

Central cavity present.

Stems with numerous branches 9. *E. ramosissimum*.

Stems with few or no branches.

Stems rather slender, 5-10 grooved 10. *E. variegatum*.

Stems stout, more than 10 grooved.

Parenchyma interrupted under the ridges; some of the
sheaths with 2 black bands 11. *E. hyemale*.

Parenchyma continuous under the ridges; sheaths with
one black band 12. *E. lævigatum*.

1. *E. arvensis* L. (COMMON HORSETAIL). Sterile stems green, 1-5 dm. high; the branches 4-angled, minutely roughened, the lowest joint longer than the stem sheath; fertile stems 1-2.5 dm. high, the sheaths very loose, brown or with a whitish base, about 12-toothed; spike 2-3 cm. long. Alaska, southw.; common in damp or grassy places. Var. *campestre* Schultz. Fertile stem branching. Var. *decumbens* Meyer. Sterile stem branching from the base, some of the lower branches decumbent. New Westminster.

2. *E. telmateia* Ehrh. (GREAT HORSETAIL). Root-stocks, at least in sandy soil, with tuber-like bodies; sterile stems white or greenish, 4-20 dm. high; the ridges of the branches very rough with minute serrulations; fertile stems white with large, very loose, brown sheaths, 20-30 toothed; spikes 3.5-8 cm. long. Very common, V.I. and west of the Cascades; wet banks. Var. *frondescens* A. Br. Fertile stem short; branching. Vancouver. Var. *Hillii* A. A. Eaton. Sheaths of the very tall, sterile stem not longer than the first joint of the branches; branches very long. New Westminster. Var. *serotinum* Milde. Sterile stem short with an abortive cone-like apex. New Westminster. Var. *Braunii* Milde. Sterile stems deeply furrowed. New Westminster.

3. *E. pratense* Ehrh. Stems 2-3 dm. high; the fertile at first without branches, but finally resembling the sterile with rather short, straight, simple, 3-angled branches; stems 8-23-ridged, beset with blunt, flat spines; the central cavity one-third the diameter. Mts., V. I. and Mainland, northward to Alaska.

4. *E. sylvaticum* L. Stems slender, 1-4 dm. high; the fertile and sterile both developing compound often recurved branches, the primary 4-angled, the secondary 3-angled; stems 8-14-ridged, the ridges with a row of recurved spinules on each side; sheaths of the main stem green at base, brown and papery above, the teeth blunt, coherent in groups. Loamy woods and river bottoms. Alaska southward and eastward; Columbia Valley; Selkirk.

5. *E. palustre* L. Stems slender; the branches erect or ascending, the 5-9 grooves of the main stem deep with wing-like ridges, which are slightly roughened by cross-bands of silex; the first joint of the branches shorter than the sheath of the main stem; central cavity less than one-third the diameter of the stem, vallicular holes large; teeth black with white margins, the base grooved, often green. Wet places; New Westminster, Sicamous, Alaska, and eastward. Var. *fallax* Milde. Stems many, branching, most of them sterile, ending in a whip-like tip. New Westminster. Var. *polystachium* Hook. Branches simple, many of them fertile. Shawnigan, V. I.

6. *E. littorale* Kuhl. Similar to the following; more slender, the stem roughish, the central cavity two-thirds the diameter; sheaths loose, the teeth more or less cohering in groups; spikes abortive, elaters wanting. Perhaps a hybrid between *E. arvense* and *E. fluviatile*. Agassiz; Shawnigan.

7. *E. fluviatile* L. Tall, 5-9 dm. high; stem not tuberculate or roughened, either distinctly or lightly 10-30-grooved, the grooves often rather obscure, simple, or with whorls of simple branches in the middle; the teeth black, rounded on the back, rigid, distinct, acute; sheaths tight, with or without a black ring at the summit. Common in water or on muddy banks; Alaska to Oregon; variable; in the Fraser Valley specimens the ridges of the stem sometimes marked with a brownish line of schlerenchyma; stems sometimes with erect branches similar to the main stem but smaller.

8. *E. scirpoides* Michx. Low, moss-like; stems tufted, filiform, about 1 dm. high, 6-ridged, solid, sheaths 3-toothed, the bristle tips persistent. Moist ground. Golden; Rockies; Alaska.

9. *E. ramosissimum* Desf. Stem 6-26 grooved, more or less rough with cross bands of silex; sheaths dilated, the teeth not grooved; leaves 3-4 carinate; branches usually copious, whorled, 4-9-angled; stomata in 1-4 lines. B.C. (Lyall) according to Underwood.

10. *E. variegatum* Schleich. Stems tufted, 1.5-3 dm. high, slender, 5-10 grooved, the ridges with broad central grooves, central cavity one-third the diameter of the stem; sheaths loose, green below, the limb black-girdled, the uppermost sometimes variegated, black and white; leaves 4-carinate; the teeth black with white margins and deciduous filiform tips; green parenchyma continuous under the keels, interrupted under the grooves. Sandy borders of lakes and rivers. Alaska to Oregon. Shuswap Lake; Donald. Var. *Alaskana* A. A. Eaton. Stems 3-5 mm. thick; ridges flat or slightly rounded, with 2 more or less distinct rows of tubercles; teeth centrally grooved. Sicamous; Lulu Island.

11. *E. hyemale* L. (SCOURING RUSH). Stems dark green, sometimes pink, mostly simple, 3-9 dm. high; ridges many with 2 rows of tubercles on each side of a slight dorsal groove; sheaths close, usually with 2 black bands separated by an ashy one, the teeth mostly deciduous; leaves obscurely 4-carinate; the central cavity two-thirds the diameter of the stem; the green parenchyma interrupted under the ridges, continuous under the grooves. Moist banks, common. Its relation to its Western varieties is seen in the following analysis.

Tubercles in rows along the ridges.

Ridges slightly grooved, a row of tubercles on each side

Ridges rounded, the two rows of tubercles close

Ridges with cross-bands of silex

E. hyemale.

Var. *californicum*.

Var. *intermedium*.

Var. californicum A. A. Eaton. Tall and stout, leaves 3-carinate, teeth deciduous, sheaths tight. Very near *E. robustum* A Br. New Westminster; Victoria; Kootenay.

Var. intermedium A. A. Eaton. More slender, 3-12 dm. high; teeth somewhat persistent, leaves 4-carinate, sheaths loose. Columbia Valley.

12. *E. lævigatum* A. Br. Stems 14-30 grooved, rough to nearly smooth, usually several from the same base, mostly annual and simple; the central cavity three-fourths of the diameter; sheaths loose, green with a black limb; the teeth of the main stem-sheaths flat towards the apex, ridged at the base, white-margined, mostly deciduous; the green parenchyma continuous under the ridges, interrupted in the grooves. Damp banks; Spence's Bridge, Sicamous, and eastward.

SELAGINELLACEÆ

Small, moss-like plants with branching, usually prostrate stems, and small scale-like leaves; sporangia solitary, axillary, some containing small powdery spores (microspores) and others large spores (macrospores). The macrospores are short, triangular-pyramidal, with a round base. The plants resemble a small Club Moss.

1. SELAGINELLA

Characteristics above.

Leaves not bristle-tipped.

Stems a few centimetres long

Stems several decimetres long

Leaves bristle-tipped.

Bristles of grooved leaves 1 mm. long or more.

Leaves much crowded; stems 5-10 cm. long

Leaves less crowded; stems 10-30 cm. long

Bristles of plane leaves less than 0.5 mm. long

1. *S. selaginoides*.

2. *S. struthioloides*.

3. *S. densa*.

4. *S. rupestris*.

5. *S. Wallacei*.

1. *S. selaginoides* (L.) Link. Stems soft and slender, rooting at base only; leaves lanceolate, acute, ascending, spreading and longer in the spike, spinulose-denticulate; the spike broader than the stem, its leaves (bracts) strongly ciliate. Margins of streams; Selkirks and Rockies, Ucluelet, Ounashashka.

2. *S. struthioloides* (Presl.) Underw. Stem scarcely rooting, flaccid, 5-15 dm. long, pinnately much branched, leaves soft, spreading, linear-lanceolate, spinulose-denticulate; spikes quadrangular, very slender, macrospores scarce. West Coast, V. I.

3. *S. densa* Rydb. Densely tufted; often yellowish-green, sterile branches very short, generally incurved; leaves linear, grooved on the back, ciliate on the margin, the bristle 1-2 mm. long; fertile branches erect, 4-angled, 1-2 cm. long, the bracts 4-ranked, deeply grooved on back, the bristle 0.3-0.7 mm. long. Common in southern B.C. on dry hillsides. (*S. rupestris* in part).

4. *S. rupestris* (L.) Spring. Gray-green; stems creeping, rooting throughout their length; leaves imbricate, 4-ranked, lanceolate-linear, grooved dorsally, the bristle 1 mm. long, the margins with 6-9 cilia; spikes quadrangular, the bracts broader than the leaves, 4-ranked, the bristle 1 mm. long. Dry hillsides. Apparently largely replaced in the West by *S. densa* and *S. Wallacei*; probably northward.

5. *S. Wallacei* Hieron. Loosely tufted, yellowish green, the stems hardly more than 10 cm. long, densely leafy; leaves plane above, ciliate-margined (cilia 7-12); bracts grooved on the back, ciliate (cilia 15-20), a little longer than the leaves and about twice as wide, the bristles less than 0.5 mm. long. Common, V. I.

ISOETACEÆ

Marsh or aquatic plants with a short bi-lobed or tri-lobed stem buried in the mud; leaves many, rush-like, bearing sporangia embedded in their bases; the inner leaves containing sporangia filled with microspores, the outer with macrospores, more or less covered by the velum, formed from the thin edges of the cavity.

1. ISOETES (QUILLWORT)

Terrestrial plants, leaves nearly triangular.

Stem tri-lobed, macrospores minutely warty 1. *I. Nuttallii*.
Stem slightly bi-lobed, macrospores densely spinulose 2. *I. maritima*.

Aquatic plants, leaves quadrangular.

Leaves erect, macrospores tuberculate or somewhat reticulate 3. *I. Bolanderi*.
Sporangia, not spotted 4. *I. Dodgei*.
Sporangia spotted with brown 5. *I. echinospora*.
Leaves recurved, macrospores spinulose, (tuberculate in var)

1. *I. Nuttallii* A. Br. Stem almost globose; leaves 20-60, 1-2 dm. long; velum covering the sporangia nearly or quite complete; microspores papillose, brown. Springy ground near Wellington.

2. *I. maritima* Underw. Stem small; leaves 8-15, 2.5-5 cm. long; sporangia $\frac{1}{3}$ - $\frac{1}{2}$ covered by the velum; microspores smooth white. Salt marshes, Alberni.

3. *I. Bolanderi* Engelm. Leaves 5-25, bright green, generally with few stomata; sporangia mostly not spotted, velum narrow; macrospores minutely tuberculate; microspores deep brown, spinulose. Lake, Sicomous; Rockies.

4. *I. Dodgei* A. A. Eaton. Leaves 10-75, erect or spiral, stomata many, sporangia $\frac{1}{4}$ - $\frac{1}{2}$ covered by the velum; 4 bast-bundles usually present; macrospores covered with coarse irregular crests; microspores wrinkled. Maine to B.C.

5. *I. echinospora* Durieu. Var. *Braunii* Engelm. Leaves 10-30, spreading, generally with a few stomata; bast-bundles none; sporangia spotted, $\frac{1}{2}$ - $\frac{3}{4}$ covered by the velum, microspores smooth. Var. *Flettii* A. A. Eaton Macrospores tuberculate, microspores spinulose. (?) Sproat Lake, (?) Alberni.

LYCOPODIACEÆ (CLUB MOSS FAMILY)

Low plants, often with long, prostrate stems; these more or less, and the erect stems fully, covered with small lanceolate or subulate persistent leaves; sporangia in the axils of the leaves or in spikes, shedding numerous, yellow, homogeneous spores.

1. LYCOPODIUM (CLUB MOSS)

Spore-cases usually reiform, 1-celled, 2-valved; spores yellow, inflammable. (Greek *lykos*, a wolf, and *pous*, a foot).

Sporangia in the axils of ordinary leaves, which are slightly modified to form an obscure spike in No. 3.

Terminal leaves without sporangia. 1. *L. Selago*.
Leaves uniform in length 2. *L. lucidulum*.
Leaves in zones, alternately longer and shorter 3. *L. inundatum*.

Terminal leaves with sporangia

Sporangia in spikes of modified leaves.

Sterile part of the branches terete, leaves in more than 4 rows, radial, equal.

Horizontal stem deep, the aerial portion tree-like 4. *L. obscurum*.

Horizontal stem, superficial, trailing.

Leaves bristle-tipped 5. *L. clavatum*

Leaves not bristle-tipped.

Leaves in 5 rows, 2-3 mm. long, branches slender 6. *L. sitchense*.

Leaves in 8 rows, longer, branches stout 7. *L. annotinum*.

Leaves in 4 rows on mostly flattened stems.

Leaves alike in all 4 rows 8. *L. sabinæfolium*.

Leaves not alike.

Spikes peduncled 9. *L. complanatum*

Spikes sessile 10. *L. alpinum*.

1. **L. Selago** L. Stems erect, rigid, stout; forking sparingly, from a short root-stock, forming a level-topped tuft; 1-2 dm. high; leaves pale green, ascending, or appressed, lanceolate, tapering from the hollowed base, entire or denticulate; sporangia borne a little below the apex, commonly producing bud-like organs (gemmae). Rocks, Alaska to Washington; Selkirks and Rockies; Kootenay. Var. **patens** Desv. Leaves long-pointed, spreading, dark green. Mts., Coast; Mt. Benson.
2. **L. lucidulum** L. Stems assurgent, leaves minutely denticulate or entire, spreading and later reflexed, flat at base, oblong-lanceolate, slightly broader at the middle, and erose, some of them a little shorter, the longer often not bearing sporangia; gemmae-bearing. Damp, mossy woods, V. I. eastward.
3. **L. inundatum** L. Low, with short, creeping, flaccid stems, the fruiting stems 2-10 cm. high, bearing a thick spike, sporophylls like the ordinary leaves, but broader at the ovate, usually toothed base; these and the leaves ascending; leaves linear-lanceolate, 4-5 mm. long, acute, soft, mostly entire, in many rows; sporangia oval. Washington to Alaska and eastward; Vancouver; Ucluelet.
4. **L. obscurum** L. Var. **dendroideum** D. C. Eaton. Creeping stem, deep, the erect stem branching freely often from the very base, somewhat tree-like; leaves lanceolate, incurving, entire spikes often solitary, sessile; sporophylls broadly ovate, short pointed. Alaska to Washington and eastward; Revelstoke.
5. **L. clavatum** L. (COMMON CLUB MOSS). Prostrate, stems stout and long, the erect with linear ascending incurved bristle-tipped leaves; spikes 1-4 on long peduncles; sporophylls bristle-tipped. Common; Alaska, Atlantic to Pacific. Var. **monostachyon** Hook. Spike solitary on a short peduncle. Roger's Pass.
6. **L. annotinum** L. Prostrate stem long, stout, with ascending branches, 1-2 dm. high; leaves lanceolate, ascending, minutely serrulate; spike solitary sessile; sporophylls ovate, acute. Mts. V. I., eastward; Alaska.
7. **L. sitchense** Rupr. Glaucous, rootstock long, branches crowded, usually less than 1 dm. high, with their rather loose leaves presenting a slender appearance; leaves equal, about 2.5 mm. long, narrow, ascending; spikes 1-few, 0.7-2 cm. long, on short, usually distinct, scaly peduncles; the sporophylls with scarious, somewhat erose margins. Mts., common; Grouse Mt., Vancouver; Alaska.
8. **L. sabinæfolium** Willd. Stem creeping, long, slender; the branches slender, slightly flattened; the leaves 1.5-2.5 mm. long, erect, equal, ascending, subulate, in 4 rows; spikes solitary, on peduncles 0-2 cm. long. Rockies and Selkirks; Mt. Arrowsmith, V. I.
9. **L. complanatum** L. Stems long, creeping, with crowded, flattened branches, arranged in somewhat fan-shaped order, and short, appressed, subulate leaves in 4 ranks, those on the under side shorter; peduncle 1 dm. long or more, slender, bearing 2-4 slender spikes; sporophylls broadly ovate, short pointed. Gold Range, eastward; Alaska.
10. **L. alpinum** L. Prostrate stems, long, creeping; branches glaucous, 2-sided; leaves of the spike-bearing branches subulate; those of the vegetative trimorphic, in the upper row narrowly ovate; in the lateral rows thick, falcate; in the under row trowel-shaped; sporophylls ovate acute; sporangia reniform. Alaska to Wn.; Cascade Mts., Griffin Lake.

TAXACEÆ (YEW FAMILY)

Trees or shrubs with evergreen linear leaves, as in *Coniferæ*, and diœcious flowers, borne on short scaly catkins, the sterile globular, formed of a few naked stamens, the fertile consisting of an erect ovule developing a fleshy coating.

1. *Taxus brevifolia* Nutt. A straggling tree, reaching a diameter of 2 feet in the Lower Fraser Valley, but usually smaller; in the mountain woods often low and hardly forming a tree trunk; bark reddish, scaly; leaves flat, 2-ranked, pointed; fruit red, drupe-like. Coast to Rockies; Skeena.

CONIFERÆ (PINE FAMILY)

Resinous trees or shrubs, the leaves mostly narrow, entire; flowers mostly monœcious in scaly catkins which become cones or, in the Juniper, berry-like; ovules 2 or more at the base of each scale, not enclosed in an ovary.

- Tribe I. CUPRESSEÆ.** Scales of the fertile flowers few, opposite; leaves 1.5-7 mm. long, or if longer, fruit berry-like.
- | | |
|--|------------------|
| Fruit berry-like. | 1. Juniperus. |
| Fruit a cone. | 2. Thuja. |
| Cone ovoid, its scales oblong | 3. Chamæcyparis. |
| Cone globose, its scales peltate with a central boss | |
- Tribe II. ABIETEÆ.** Scales of the fertile flowers many, alternate; leaves 1 cm. or more in length.
- | | |
|---|-----------------|
| Leaves in clusters of 2 or more. | |
| Leaves evergreen, the cluster with a basal sheath | 4. Pinus. |
| Leaves deciduous, the cluster sheathless | 5. Larix. |
| Leaves solitary. | |
| Cones erect, scales deciduous | 6. Abies. |
| Cones pendant, scales persistent. | |
| Bracts 3-lobed, longer than the scales | 7. Pseudotsuga. |
| Bracts not 3-lobed, shorter than the scales. | |
| Leaves petioled, blunt, cones small | 8. Tsuga. |
| Leaves sessile, sharp, cones large | 9. Picea. |

1. JUNIPERUS (JUNIPER)

Shrubs or small trees, usually diœcious, with subulate or scale-like leaves, the 2 kinds often borne on the same plant; anther-cells 4-8 under the shield-shaped scales; fertile catkins of 3-6, fleshy, coalescent scales which finally become a berry-like, blue fruit, ripening the second year; seeds ovate, wingless, bony. (The classical name).

- | | |
|---|---------------------------|
| Leaves all subulate without a glandular spot | 1. <i>J. communis</i> . |
| Leaves of 2 kinds, subulate and scale-like, the latter usually with a glandular spot on the back. | |
| Prostrate, leaves green, the scale-like with a short spinose tip | 2. <i>J. prostrata</i> . |
| Erect, leaves acute, glaucous | 3. <i>J. scopulorum</i> . |

1. *J. communis* L. A low tree or shrub, leaves 8-13 mm. long, straight or nearly so, shallowly channelled above, acuminate, green above, a white stripe beneath; fruit glaucous, seed ovoid, angled. Alaska southward to Wn. Var. *sibirica* (Burgsd.) Rydb. Low, spreading, the ascending branches often in basket-like clumps, 1 m. high or less and often 2 m. broad; leaves abruptly bent at base, deeply channelled; abruptly acute. Golden.

2. *J. prostrata* (Pers.) Antoine. Prostrate, sometimes rooting; scale-like leaves acutely cuspidate in 4 rows, the branchlets short, somewhat quadrangular; fruit glaucous, on very short peduncles, seeds 2, with 2 blunt ridges towards the apex. (*J. Sabina* var. *procumbens*). Golden.

3. **J. scopulorum** Sarg. A small tree; the gland not whitish; the subulate leaves 3-7 mm. long, straight, obscurely or not at all glandular at base, glaucous on both faces, gradually or abruptly tapering; the scale-like acutely or somewhat bluntly pointed leaves with a more or less evident gland or pit in the middle of the back; fruit glaucous on short recurved pedicels; seeds 1-2, angled and grooved. Dry, rocky places; Golden; Princeton; Islands of Gulf of Georgia; V. I.

2. THUJA (CEDAR)

Branches flat in a flat spray; leaves short, scale-like, in 4 rows; stamens with a scale-like filament bearing 4 anther cells; pollen simple; scales of the ovoid cone 16 or fewer, the middle ones fertile, a more or less evident mucro below the apex. (Greek *thuiā*, some evergreen).

1. **T. plicata** Donn. A very large tree, the trunk often 3 m. in diameter; bark thin, fibrous; leaves closely appressed or sometimes slightly spreading and more acute; cones soon reflexed, 12-15 mm. long, seeds 2 on each scale, somewhat unequally winged. Coast to Rockies; Southern Alaska.

3. CHAMÆCYPARIS (CYPRESS)

Resembling the former in general appearance; stamens with 2-4 anther cells; branchlets terete; cones globose, their thick scales pointed or bossed in the middle. (Greek *chamai*, on the ground, *kyparissos*, a cypress).

1. **C. nootkatensis** (Lamb) Spach. (YELLOW C.) A large or small tree, sometimes 1 m. in diameter, but in the south of the province seldom exceeding 3-5 dm.; branchlets teretish, slender, drooping, leaves hardly glandular; cones 10-12 mm. thick; seeds 2-4 on each scale, narrowly winged. Coast region, occasional in the south; Alaska.

4. PINUS (PINE)

Trees or shrubs with smooth or flaky bark; leaves long, in clusters of 2-5, sheathed at base; anther cells 2, with a scale-like connective, opening longitudinally; pollen of 3 united grains, 2 of them empty; cones with very thick scales, thickest near the apex, often with a short infra-apical point; the cones maturing the second year. (The classical name).

Leaves in 2's or 3's, scales with a long sharp infra-apical point.

Leaves all in 2's; cones 2-5 cm. long

Leaves mostly in 3's; cones 8-14 cm. long

Leaves in 5's; scales unarmed.

Wing much longer than the seed, cones 1-2 dm. long

Wing shorter than the seed.

Cones 4-8 cm. long, not opening widely at maturity

Cones 8-20 cm. long, opening widely at maturity

1. *P. contorta*.

2. *P. ponderosa*.

3. *P. monticola*.

4. *P. albicaulis*.

5. *P. flexilis*.

1. **P. contorta** Dougl. (SCRUB P.) A small scrubby tree, but sometimes becoming tall and reaching a diameter of 5 dm., leaves 3-7 cm. long, concave-convex; cones ovoid, remaining many years on the trees, and hardly opening. West of the Cascades in swamps, or on sandy dunes and dry rocky ridges; Alaska. Var. **Murrayana** Engelm. (LODGE-POLE P.) A small slender tree, not distinct from the species, forms extensive forests east of the Cascades.

2. **P. ponderosa** Dougl. (WESTERN YELLOW P.) A large tree with thick, reddish, furrowed bark, the trunk 0.7-1.5 m. in diameter; leaves deep yellow-green, 10-15 cm. long, mostly in 3's; cones ovoid, sessile, 0.8-1.4 dm. long, often clustered, falling in 2 years; wings of seeds large; scales with a strong infra-apical prickle; wood yellowish. The Dry Belts east of the Cascades; northward to Clinton.

3. **P. monticola** Dougl. (WESTERN WHITE P.) A large tree; bark thick, broken into square plates on old trunks; leaves bluish-green with a whitish tinge, 5-10 cm. long; cones resinous, cylindrical, drooping, 10-20 cm. long, peduncled, maturing the second year; scales 4-5 cm. long, red below, with a gray or brown apex, the infra-apical prickles wanting; seed $\frac{1}{2}$ as long as the wing. Scattered trees; Cascade and Coast Mts.; V. I., where it sometimes grows in swamps; Columbia Valley, northward to Donald.

4. **P. albicaulis** Engelm. (WHITE-BARK P.) A large tree, or stunted at higher elevations; the light gray, thin bark broken into oblong plates on old trunks; leaves yellow-green, 3-8 cm. long; scales without prickles, very thick with an apical point; cones ovoid, deep purple, 4-8 cm. long, sessile or nearly so; seeds shed without the very narrow wing which adheres to the scale. (*P. flexilis albicaulis*). Mts., Coast to Rockies, (not on V.I.), extending northward to lat. 53°.

5. **P. flexilis** James (LIMBER P.) A small or large tree; leaves dark yellow-green, 3-7 cm. long, the light gray bark broken into roundish or square plates on old trees; cones ovoid, 8-20 cm. long, nearly sessile, scales greatly thickened at tip which has an apical point; seeds nearly wingless. Scattered trees in the Rockies and Mts. east of the Cascades.

5. LARIX (LARCH)

Leaves linear, soft, deciduous, very many in a fascicle, from short bud-like branches; sterile catkins naked, the fertile leafy at base, from bud-like branches; cones erect, dark purple in flower, the bracts longer than the scales. (The ancient name).

1. **L. occidentalis** Nutt. (WESTERN L.) A large tree, trunk 3-8 dm. in diameter, with thick, fissured bark; branches brittle, soon glabrous; leaves in clusters of 14-30, yellow-green, turning yellow in autumn, 2.5-3.5 cm. long, without resin ducts; scales orbicular, ciliate-fringed and tomentose below when young; bracts ovate with a long linear tip; seeds with wing 4-5 mm. long. Okanagan to Columbia Valley.

2. **L. Lyallii** (Par.) (ALPINE OR WOOLLY L.) A rather small tree; bark indistinctly fissured; branches tough, branches and bud-scales pubescent or woolly with rusty or white hairs; leaves blue-green, 2.5-3.5 cm. long, 30-40 in a cluster, with 2 resin ducts; cones 3-5 cm. long, the scales roundish, tomentose-pubescent on back and margins. Alpine, forming the last belt of trees in the Rockies.

3. **L. laricina** Koch. (TAMARACK). A small tree, 2-3 m. high; leaves 1.5-2.5 cm. long, 12-20 in a cluster, with 2 minute resin-ducts close to the outer edges; cones ovoid, 1-2 cm. long, bracts mostly shorter than the roundish or oblong scales. Yukon to the Liard River, lat. 59°, and eastward.

6. ABIES (FIR) (BALSAM)

Stems with balsam-blisters; leaves flat or thick, 2 ranked, with 2 resin-ducts, leaving smooth roundish scars on the smooth or hairy branchlets; cones erect, mostly puberulent, maturing the first year, and readily falling in pieces, balsam-bearing; the erose, pointed bracts much shorter than the scale (in *A. nobilis* Lindl. south of our range, exserted). (The classical name).

Cones green, seeds including wing about 1.5 cm. long 1. *A. grandis*.

Cones purple, seeds including wing about 2 cm. long.

Upper surface of leaves with many stomata; cones cylindrical, 3-3.7 cm. thick

2. *A. lasiocarpa*.

Upper surface of leaves, with few or no stomata; cones ellipsoidal, 5-6 cm. thick

3. *A. amabilis*.

1. **A. grandis** Lindl (WHITE FIR). A large tree, 50 m. or more high; bark brown, smoothish; leaves spreading, very clearly 2-ranked on lower branches, 2-4.5 cm. long, with strongly marked white lines beneath, flat, the midrib little thickened, apex of lower leaves blunt, notched; resin-ducts very near the lower surface, the upper surface strongly grooved with few

or no stomata; cones about 10 cm. long, cylindrical, 2.5-3 cm. thick, the scales much broader than long. West of the Cascades mingled with Douglas Fir, seldom forming pure growths.

2. *A. lasiocarpa* (Hook) Nutt. (ALPINE F.) A small tree 20-30 m. high, or much lower in exposed situations, with a spire-like crown; bark gray-brown, smoothish, becoming seamed; leaves blunt, emarginate or often acute and curling over the branches above; resin-ducts large, about midway between the 2 surfaces; cones 3-10 cm. long; scales oblong-obovate, puberulent over most of the lower surface; seed-wings 8-10 mm. broad; bracts slightly obcordate. Alpine, Coast to Rockies; Alaska. Specimens from Mt. Garibaldi with small, apparently not fully developed cones, are this species, or possibly a var.

3. *A. amabilis* Forbes. (LOVELY F.) Similar, often larger, usually with a broader, rounder apex; resin-ducts small, near the lower surface of leaf; cones about 10 cm. long, scales puberulent to glabrous; bracts roundish with a lanceolate tip; seed-wings 10-12 mm. broad. Alpine and sub-Alpine, Mts., V. I.; Cascades.

7. PSEUDOTSUGA

Very large trees with thick deeply furrowed bark; the branches not roughened by the persisting leaf-bases; anther connective terminating in a short point, the cells opening longitudinally; cones maturing the first year, their scales with exserted 3-lobed bracts. (Greek *pseudo*, false, and *Tsuga*).

1. *P. mucronata* Raf. (DOUGLAS FIR). Trunks becoming 2 m. in diameter; leaves obtuse, petioled, channelled above, 2 white stripes below, slightly 2-ranked; cones narrowly ovoid, about 8 cm. long; scales broadly ovate; the middle lobe of the prominent bract the narrowest; wood reddish. (*P. Douglasii*) Rockies to Coast; northward to Fort McLeod.

8. TSUGA (HEMLOCK)

Large trees with slender, often drooping, branches, which are hairy when young; the young trees easily recognized at some distance by the slender drooping tip; sterile flowers a subglobose cluster of stamens from the axils of last year's leaves, the stipe surrounded by numerous bud scales; the anthers knobbed or spurred, opening transversely; cones pendulous, maturing the first year; scales thin, a little longer than the bracts. (The Japanese name of one species).

1. *T. heterophylla* Sarg. (WESTERN H.) Leaves 8-22 mm. long, flat, usually finely spinulose-serrulate towards the apex, 2 broad white stripes beneath; stomata on the under surface only; cones about 1.5 cm. long. Coast; Selkirks; Alaska.

2. *T. Mertensiana* Carr. (MOUNTAIN H.) Leaves 12-24 mm. long, keeled above, especially towards the apex, entire, hardly paler beneath, stomata on both sides; cones 4 or 5 cm. long. Mts., V. I. and Coast; plentiful in the Selkirks; northw. to Fort George.

9. PICEA (SPRUCE)

Large trees with flaky bark; branchlets rough with the persistent leaf-bases; the horny-tipped leaves not in 2 ranks, keeled above and rounded or keeled below, more or less quadrangular in cross-section; sterile flowers on branches of the preceding year, the anthers tipped with a rounded, recurved appendage, opening longitudinally; cones maturing the first year, becoming pendulous, their scales thin, the bracts much shorter. (The classical name for the Pine).

Cones 2-3 cm. long, persistent for several years, the scales brittle at maturity

Cones deciduous the first season; the scales flexible at maturity.

Bracts half as long as the scale; cones 5-8 cm. long

Bracts less than $\frac{1}{4}$ as long as the scale.

Bracts ovate or oblong, obtuse; leaves bluntish, branchlets pubescent

Bracts round, acutish; leaves sharp; branchlets usually glabrous

1. *P. mariana*.

2. *P. sitchensis*.

3. *P. Engelmanni*.

4. *P. Canadensis*.

1. **P. mariana** (Mill.) B. S. P. (BLACK S.) A small tree; branchlets pubescent; leaves thick, 4-angled, 6-10 mm. long, dark blue-green, with a tinge of bloom; cones short-ovoid; scales erose; bracts short. Alaska to the Upper Fraser Valley and eastward.

2. **P. sitchensis** Carr. (SITKA S. or TIDELAND S.) A very large tree with scaly bark, trunk becoming 2 m. in diameter; branches long, branchlets glabrous, thick, side-branchlets drooping; leaves flattish, about 2 cm. long, very sharp-pointed, 2 narrow white lines above, 2 broad ones beneath; cones cylindrical, light-brown; scales oblong, thinnish, erose; bracts entire; wood whitish. West of the Cascades, Alaska to Cal.

3. **P. Engelmanni** Engelm. A large tree with scaly bark, becoming 1 m. in diameter, branches long at base, much shorter above, forming a spire-like outline; branchlets glandular-pubescent, the side branchlets drooping; the persistent leaf bases somewhat deflexed or spreading, leaves thick, 10-17 mm. long, bluntish, callous-pointed, 4-angled, the white lines not evident above, clearer beneath, the young leaves fetid when crushed; cones cylindrical, light brown, 3-6 cm. long; scales ovate or obovate to ovate-oblong, sometimes pointed, often narrowed towards the base, erose or entire, bracts erose, not $\frac{1}{4}$ as long, (3 mm. long); wood very light-yellowish. Rockies and Selkirks; Kamloops; Hazelton.

4. **P. canadensis** (Mill) B. S. P. (WHITE S.) A small or large tree, 20 m. high; with drooping side-branchlets, twigs glabrous or sometimes pubescent; leaves slender, 4-angled, 12-20 mm. long, light blue-green with a whitish bloom; the persistent leaf-bases erect; cones 2.5-6 (usually about 4.5) cm. long, green or rose colored, becoming brown; scales entire; bracts small. (**P. albertina** Brown, a Rocky Mt. form with short cones). Alaska to the Stikene; Rockies eastward. The bruised young leaves emit a fetid odor, hence the name Cat-Spruce.

TYPHACEÆ (CAT TAIL FAMILY)

Marsh herbs with long, flat, sessile leaves, and small, monœcious flowers without a proper perianth, in crowded spikelets arranged on a dense cylindrical spadix; ovary 1-celled with a persistent style and a spatulate stigma.

1. TYPHA

Staminate flowers uppermost intermingled with long hairs; pistillate flowers below, consisting of a stipitate ovary surrounded by bristles and intermingled with sterile clavate flowers.

1. **T. latifolia** L. (CAT-TAIL). Stout, 1.5-2.5 m. high; spikes dark brown, the sterile and fertile parts contiguous and clearly different; the latter persisting and forming the "Cat-tail"; pollen grains in 4's. Throughout temperate North America.

SPARGANIACEÆ (BUR-REED FAMILY)

Marsh or aquatic plants with alternate sessile, 2-ranked leaves, and monœcious flowers in dense, distant, globose heads; the lower heads pistillate and often peduncled, the upper staminate and sessile; the perianth represented by scales, which are more or less regularly arranged in the fertile flowers.

1. SPARGANIUM

The only genus; characteristics above.

- | | |
|---|----------------------------------|
| Fruits sessile, angled, obovoid, inflorescence branched. | |
| Fruit truncate or retuse at apex | 1. <i>S. eurycarpum</i> . |
| Fruit rounded at apex | 2. <i>S. Greenei</i> . |
| Fruits mostly short-pedicellate, terete, fusiform | |
| Inflorescence branched | 3. <i>S. androcladum</i> . |
| Inflorescence simple. | |
| Beak of fruit 2-5 mm. long, staminate heads 4-6. | |
| Plants stout, leaves keeled, stigma 2 mm. long | 4. <i>S. simplex</i> . |
| Plants slender, leaves hardly keeled, stigma 1 mm. long. | |
| Leaves 3-4 mm. wide, fruiting heads about 1.5 cm. in diameter | 5. <i>S. angustifolium</i> . |
| Leaves 4-10 mm. wide, fruiting heads 1.5-2 cm. in diameter | 6. <i>S. multipedunculatum</i> . |
| Beak of fruit 0.5-1.5 mm. long, staminate heads 1-2 | 7. <i>S. minimum</i> . |

1. *S. eurycarpum* Engelm. Stout, erect, 5-10 dm. high; leaves 3-10 dm. long; peduncles branched below; the lower branches with 2-6 staminate heads, pistillate heads 2-6, sessile or peduncled, 2-3 cm. thick; stigmas often 2, about 2 mm. long; achenes obpyramidal, angled, with a broad and truncate or depressed summit abruptly tipped in the centre with a beak 3 mm. long; stigmas 2 mm. long. Alberta and Wn.; doubtless in eastern B.C.

2. *S. Greenei* Morong. Similar; the lower branches of the inflorescence with 6-10 staminate heads; achenes 7-9 mm. long, beak 2 mm. long, stigmas 1 mm. long. V. I. to California; in water.

3. *S. androcladum* Engelm. Slender, 2-5 dm. high, leaves long; inflorescence compound; pistillate heads 3-7, axillary, sessile or the lower peduncled, 12-25 mm. thick; stigma usually 1-2 mm. long; fruit beaked, acute, often contracted in the middle. Marshes; Nanaimo; Victoria; and across the Continent.

4. *S. simplex* Huds. Rather stout, 3-6 dm. high; leaves more or less keeled; pistillate heads sessile, or the lower peduncled, often supra-axillary; fruits sometimes contracted in the middle; stigma 1. Marshes and ponds, common. V. I., Vancouver and eastward.

5. *S. angustifolium* Mich. Slender, floating, 3-9 dm. long, leaves 3-4 mm. broad, narrow, flatter, hardly keeled, pistillate heads somewhat supra-axillary, the lower often peduncled; stigma hardly 1 mm. long, fruit contracted in the middle, stipe 1.5 mm. long. Mt. Arrowsmith and Alpine Lakes, not common, (*S. affine* Schmitz).

6. *S. multipedunculatum* (Morong.) Rydb. Slender, erect or floating; leaves 4-10 mm. wide, hardly keeled, staminate heads approximate, usually distant from the pistillate, which are 1.5-2 cm. in diameter; achene fusiform, stipe 2-2.5 mm. long; stigma 1 mm. long. B.C. to California and Ontario.

7. *S. minimum* Fries. Slender, floating, 1-4 dm. long, leaves thin and flat, 2-6 mm. wide, heads mostly sessile, the pistillate 1-3, 8-10 mm. thick; achenes sessile or short-stipitate, ellipsoid to obovate, usually contracted below the middle. Shallow water, Clanwilliam (Selkirks); Columbia Valley; San Juan Lake, V. I.

NAJADACEÆ (PONDWEED FAMILY)

Aquatic or marsh herbs with leafy stems, the leaves sheathing at the base or stipulate; flowers perfect or unisexual, solitary or clustered, sometimes spathaceous; perianth of 4-6 segments, stamens 1, 2, 4 or 6; ovaries 1-6, distinct, 1 celled, 1-ovuled, superior, indehiscent.

- Flowers perfect, spiked or clustered, ovaries 4.
 Spike peduncled, sepals 4 1. *Potamogeton*.
 Flowers on an inclosed spadix, perianth none 2. *Ruppia*.
 Flowers monœcious or dioecious, ovary 1, 4 in No. 6.
 Plants growing in the sea near low-tide mark.
 Flowers monœcious; fruit rounded at base 3. *Zostera*.
 Flowers dioecious; fruit sagittate at base 4. *Phyllospadix*.
 Plants not growing near low-tide mark.
 Plants stemless, flowers monœcious, inflorescence scapose or basal. 5. *Lilæa*.
 Plants with stems, inflorescence axillary.
 Leaves entire 6. *Zannichellia*.
 Leaves finely serrate 7. *Najas*.

1. POTAMOGETON (PONDWEED)

Plants of lakes and streams; the immersed leaves 2-ranked, pellucid, the floating thicker; stipules more or less united and sheathing; sepals 4, rounded; stamens 4, opposite the sepals; ovaries 4 (rarely 1), style short; fruit drupe-like; spikes sheathed by the stipules in bud, mostly raised above the water.

Floating leaves present, differing from the submerged.

- Lower submerged leaves linear, 2-4 mm. wide.
 Submerged leaves not reticulated along the midrib 1. *P. natans*.
 Submerged leaves reticulated along the midrib 2. *P. epihydrus*.
 Submerged leaves lanceolate, wider.
 Floating leaves 30-45 veined 3. *P. amplifolius*.
 Floating leaves 18-24 veined.
 Petioles of floating leaves short, foliage reddish 4. *P. alpinus*.
 Petioles of floating leaves long.
 Mature spikes 4-5.5 cm. long.
 Submerged leaves mucronate, stipules obtuse 5. *P. angustifolius*.
 Submerged leaves and stipules acuminate 7. *P. americanus*.
 Mature spikes 1.5-3.5 cm. long 6. *P. heterophyllus*

Floating leaves wanting, all the leaves similar.

- Leaves lanceolate or oblong or wider.
 Leaves not clasping.
 Mature spikes 3.5-5.5 cm. long 8. *P. lucens*.
 Mature spikes shorter.
 Foliage reddish 4. *P. alpinus*.
 Foliage green 6. *P. heterophyllus*
 Leaves clasping or perfoliate.
 Leaves half-clasping, stipules conspicuous, fruit sharply keeled . 9. *P. prælongus*.
 Leaves cordate-clasping, stipules in shreds, fruit obscurely or
 obtusely keeled 10. *P. Richardsonii*.

Leaves linear or filiform.

- Stipules not adnate to the leaf bases; spikes globose, loosely
 flowered or sometimes interrupted.
 Leaves glandless.
 Leaves grass-like, 2-4 mm. wide 11. *P. zosterifolius*.
 Leaves filiform, hardly 1 mm. wide 14. *P. foliosus*.
 Leaves bi-glandular at base.
 Leaves 5-7 nerved, stipules 1-2 cm. long 13. *P. Friesii*.
 Leaves 1-3 nerved, stipules less than 1 cm. long 12. *P. pusillus*.
 Stipules adnate to the leaf-bases; spikes interrupted.
 Leaves 4-8 mm. wide 15. *P. Robbinsii*.
 Leaves 1 mm. wide or less.
 Stigma capitate, style short 16. *P. pectinatus*.
 Stigma broad, sessile 17. *P. filiformis*.

1. *P. natans* L. Stem simple or sparingly branched; floating leaves revolute, thick, 3-10 cm. long, elliptical or ovate, 2.5-5.5 cm. wide, blunt-pointed, cordate or acute at base; stipules 4-7 cm. long; at least the lower submerged leaves bladeless with acute stipules, 3-4 cm. long; spikes 3-6 cm. long; fruit obovoid, 4 mm. long, the sides of the turgid nutlet with a small deep pit on each side; embryo an incomplete spiral. Lakes, Atlantic to Pacific; V. I.

2. *P. epihydrus* Raf. Simple or branched, floating leaves elliptical-lanceolate, 3-9 cm. long, 6-15 mm. wide, acute at base; stipules 2-2.5 cm. long; submerged leaves sessile, linear-lanceolate, spikes 1-6 cm. long, nutlets 3-keeled, pitted, embryo a complete spiral. B.C. to Nfld.

3. *P. amplifolius* Tuckerm. Stem simple; floating leaves oblong-lanceolate or elliptical, acutish, cordate or rounded at base, on rather long petioles; submerged leaves lanceolate or oval, usually falcate, 0.8-2 dm. long; stipules

long, acuminate; peduncles thickened upwards; spikes 3.5-8 cm. long; fruit obovoid, 4-4.5 mm. long, 3-keeled, nutlet slightly impressed, not pitted. B.C. to N.S.; near Victoria.

4. **P. alpinus** Balbis. Stems mostly simple; floating leaves often wanting, 3.5-8 cm. long, oblanceolate, narrowed to a short petiole, 11-21 nerved; submerged leaves nearly sessile, oblong-lanceolate, about 7-nerved; stipules broad, obtuse, the upper ones acute; spike 1.5-3.5 cm. long, simple or compound, fruit lenticular, beaked with the rather long style, pitted when immature. (*P. rufescens* Schrad). Streams; Nanaimo; Atlantic to Pacific; Ounalashka.

5. **P. angustifolius** Berch. and Presl. Slender, branched at base, the upper leaves coriaceous, sometimes immersed, long-petioled, 0.4-1 dm. long, 1-2.5 cm. wide, 13-21-veined, the others subsessile, lanceolate mucronate, crisped, shining, 7-17 veined; stipules obtuse, 1.5-4 cm. long, peduncle elongated; fruit 3-keeled, 3-4 mm. long. (*P. Zizii* Roth.) Griffin Lake, Gold Range.

6. **P. heterophyllus** Schreb. Stems slender, branching below; floating leaves thin, variable, bluntly-pointed, 9-17 nerved, 1.5-7 cm. long, 0.5-2.5 cm. wide; the submerged lanceolate or linear-lanceolate, acuminate, short or long (2.5-8 cm.) 2-13 mm. wide, 3-7-nerved; stipules obtuse; peduncles thick elongated, fruit 2.5-3 mm. long, roundish, scarcely keeled. Atlantic to Pacific; Lulu Island; common on V. I.

7. **P. americanus** C. & S. Often branching; floating leaves thinnish, lance-oblong or narrowly elliptical, often acute, long petioled, 4-11 cm. long, 1-3 cm. wide, 17-23-veined; submerged leaves 0.8-3 dm. long, lanceolate, 7-15-veined; peduncles stout; fruit obovoid, more or less distinctly 3-keeled, the middle keel winged above; sides of nutlet scarcely impressed. (*P. lonchites* Tuckerm.) N. B. to Wn. and B. C.

8. **P. lucens** L. Stem thick, branching; leaves more or less petioled, narrowly elliptical or lanceolate, acute, mucronate, often crisped, frequently shining, 6-20 cm. long, about 13 nerved; peduncles usually elongated; fruit roundish, scarcely keeled, spike dense, 4-5 cm. long. B. C. to N. S.

9. **P. praelongus** Wulf. Stem white, flexuous, branching, leaves lanceolate, 1-3 dm. long, obtuse, hooded at apex, stipules white, obtuse, 1.5-3 cm. long; peduncles very long, spikes rather loose, 2-3 cm. long; fruit sharply keeled, 4-5 mm. long, plane on one side. Lakes V. I. to Atlantic.

10. **P. Richardsonii** (Benn.) Rydb. Stem branching; leaves lanceolate, wavy, 3-11 cm. long; stipules conspicuous, usually in shreds; peduncles thickened upwards, spongy, sometimes 1 dm. long; spikes 1.5-3.5 cm. long; fruit obovoid, obscurely 3-keeled, 4 mm. long, wrinkled in drying. Sicamous; Kamloops.

11. **P. zosterifolius** Schum. Stem branching, flattened, winged; leaves grass-like, 0.5-2 dm. long, 2-4 mm. wide, with 3 strong and many fine nerves; stipules oblong, obtuse, 1-3 cm. long, soon perishing; spikes cylindrical, 12-15-flowered, about 15 mm. long; fruit obliquely obovoid, 3.5-4.5 mm. long, somewhat keeled. Plant propagated by terminal leafbuds which fall to the bottom. B.C. to Oregon and eastward; Langford Lake, V. I.

12. **P. pusillus** L. Stem filiform, often branching; leaves about 1 mm. wide, 2-6 cm. long, 1-3-nerved, with translucent glands on each side at the base; internodes usually exceeding the leaves; stipules short, obtuse, deciduous; spikes interrupted or usually capitate, 2-10-flowered; peduncles 1-3 cm. long; fruit scarcely keeled, 1.5-2 mm. long, ellipsoidal, producing occasional propagating buds. Fort McLeod; Shawnigan; eastward to the Atlantic.

13. **P. Friesii** Rupr. Similar; stem more flattened and less branching, leaves 1-3 mm. wide, 5-7 nerved; stipules conspicuous, white-hyaline; glands small, dull; spikes becoming interrupted, 0.8-1.6 cm. long; propagating buds abundant. Atlantic to Pacific. Spillamacheen River, Enderby.

14. *P. foliosus* Raf. Stem filiform, flattish, branching; leaves less than 1 mm. wide, 2-6 cm. long, obscurely 3-nerved, stipules obtuse; spikes capitate, 1-4-flowered, on short club-shaped peduncles; fruit roundish-lenticular, the back somewhat crested; no propagating buds. (*P. pauciflorus* Pursh.) B.C. to N.B.

15. *P. Robbinsii* Oakes. Stem rigid, invested by the bases of the leaves and stipules; leaves crowded, recurved-spreading, 7-12 cm. long, acuminate ciliate-serrulate, many-nerved; stipules obtuse, becoming bristly-shreddy; spikes numerous, loosely few-flowered on short peduncles; fruit keeled with a broadish wing. Atlantic to Pacific; Lakes V. I., Somas River, Alberni.

16. *P. pectinatus* L. Stem filiform, branching, leaves alternate to apex, 1-nerved, peduncles filiform; spikes of 2-6 remote whorls; fruit obovoid, compressed, 3.5-4.5 mm. long, rounded on the back, obscurely ridged on the sides; embryo spiral. Alberni; Kamloops; Rockies and eastward.

17. *P. filiformis* Pers. Stems filiform from tuberiferous rootstocks, branching; leaves filiform; peduncles elongated and overtopping the leaves (or sometimes shorter), spikes in 2-5 distant whorls; fruit 2.5-3 mm. long; globose-obovoid, not keeled on the rounded back; embryo annular. (*P. marinus*) Near Spence's Bridge, Alta., and eastward.

2. RUPPIA (DITCH GRASS)

Flowers naked, 2 or more on a gradually elongating peduncle (spadix) which is at first enclosed in the sheathing base of the leaf; the flowers in 2 sets on opposite sides of a rachis, each consisting of 2 separated sessile anther cells with 4 pistils between them, sessile at flowering, but later the small pointed drupe raised on a pedicel 1-2 cm. or so long.

1. *R. maritima* L. Stems brownish-red, 3-6 dm. long, branching; leaves 2-10 cm. long, linear; peduncles elongating after flowering, often coiling, usually 2-3 cm. long; sheaths 6-8 mm. long, fruit about 2 mm. long, pedicels 2 cm. long. In brackish or salt water; Vancouver; Alberni; Delta of Fraser River.

2. *R. occidentalis* Wats. Similar; branches and leaves often clustered at the nodes; leaves 7-20 cm. long; sheaths 12-36 mm. long; fruit 3-4 mm. long; pedicels less than 2.5 cm. long, often bright red. (*R. lacustris* Macoun) Saline ponds, Kamloops.

3. ZOSTERA (EEL GRASS, CRAB GRASS)

Flowers monœcious, the pistillate and the staminate without perianth, arranged alternately on the midrib of a leaf-like spadix, which is enclosed in the long sheath-like base of a leaf (representing a spathe); the staminate flowers of 1-celled sessile anthers with pollen in the shape of tufted threads; the pistillate of a single ovary attached near its apex and tapering into a deciduous, rather long, style; stigmas 2, fruit a utricle, rounded at base, containing a ribbed nutlet.

1. *Z. marina* L. Leaves 6-12 mm. wide, 3-20 dm. long, the broadest 10-13-nerved. In mud, just below low tide mark, or on mud flats; salt water; Alaska to Cal.

4. PHYLLOSPADIX (FALSE EEL GRASS)

Flowers diœcious, without perianth, staminate flowers consisting of numerous sessile anthers in 2 rows on a leaf-like spadix, pollen thread-like; pistillate flowers of sessile ovaries attached in 2 rows above the base, tapering into a short style; stigmas 2; fruit a utricle, cordate at base; seeds not ribbed; leaves grass-like as in *Zostera*. Growing on rocks, exposed at low tide.

1. *P. Scouleri* Hook. Leaves flat, 2 mm. wide or more; peduncles basal, simple, solitary or in 2's, 1-10 cm. long. Near Victoria.

2. *P. Torreyi* Wats. Leaves, 1.5 mm. wide or less; peduncles cauline; spadix with a foliaceous appendage. West Coast, V. I. Both species with a row of scales on each side of fruit.

5. LILÆA

Stemless annuals growing in shallow, fresh or salty water; leaves terete; flowers perfect or unisexual, the basal flowers pistillate, enclosed by the sheathing bases of the leaves, pistil 1 with a long filiform style and one stigma; scapose inflorescence of both staminate and pistillate flowers irregularly disposed in a spike; stamen 1, bracted; fruit ribbed, or narrowly winged.

1. *L. subulata* H. & P. Leaves 1-6 dm. long, 2-4 mm. thick, the scapes shorter than the leaves. In mud between high and low water, Somas River, Alberni. Oregon, but not Wn.

6. ZANNICHELLIA (HORNED PONDWEED)

Staminate and pistillate flowers in the same axil, at first enclosed in a thin envelope; the staminate consisting of 1 stamen; the fertile of 2-5 sessile pistils in the same cup-shaped involucre, becoming beaked elongate nutlets in fruit; style short, stigmas broad. Slender herbs with linear opposite entire leaves and sheathing stipules.

1. *Z. palustris* L. Leaves about 8 cm. long and less than 1 mm. wide; fruit somewhat falcate, the style about half as long as the body. In brackish water or fresh water ponds and streams in most parts of the world. Enderby.

7. NAJAS (NAIAD)

Flowers monœcious or diœcious, solitary or clustered, sessile; the staminate consisting of 1 stamen enclosed in a membranous spathe; the fertile of a single pistil with a short style and 2-4 awl-shaped stigmas; fruit a small nutlet in a loose membranous epicarp. Slender herbs, growing in fresh water; leaves linear, opposite.

1. *N. flexilis* (Willd.) R. & S. Leaves very narrowly linear, very minutely serrate; fruit 2.5-3 mm. long, oblong; seeds shining. In most parts of North America. Alberni; Enderby.

JUNCAGINACEÆ (ARROW-GRASS FAMILY)

Marsh plants; leaves terete, at least below; flowers perfect, in spikes or racemes; the perianth deeply 6 lobed; stamens 3-6; carpels 3 or 6, more or less united, separating at maturity.

Stem leafy, flowers bracted	1. Scheuchzeria.
Stem leafless, flowers bractless	2. Triglochin.

1. SCHEUCHZERIA

Perianth persistent, greenish yellow or whitish; stamens 6, anthers linear; ovaries 3, globular, slightly united at the base; stigmas not plumose, sessile; leaves sheathing at base; stem zig-zag terminated by a loose raceme of a few flowers.

1. *S. palustris* L. Stems 1.5-3 dm. high, rather shorter than the leaves; pedicels spreading in fruit. Bogs across the continent; Rockies; Alaska southward; Cowichan Lake.

2. TRIGLOCHIN (ARROW-GRASS)

Perianth greenish, deciduous; stamens 3-6, anthers oval, filaments very short; pistils united into a 3-6-celled compound ovary; stigmas sessile, plumose; leaves sheathing at base; stem straight, terminating in a long spike.

1. *T. maritima* L. Scape and leaves stout, reaching 10 dm.; the stem exceeding the half-terete leaves; pedicels 3-6 mm. long, erect, fruit cylindrical-ellipsoidal, rounded at the base; separating from a linear axis. Common in salt marshes at the Coast; also in saline marshes in the interior; Alaska.

2. *T. palustris* L. Scape (0.5-5 dm. high) and leaves slender; stamens 6; fruit linear-clavate, acute at base, separating from a triangular axis pedicels very slender, about 5 mm. long. Marshes, V. I. eastward; Cameron Lake; Field; Alaska.

ALISMACEÆ (WATER-PLANTAIN FAMILY)

Marsh herbs; stems scape-like, with sheathing radical leaves; flowers perfect, petals 3, deciduous, usually white, sepals 3, persistent; stamens 6 or more, included; pistils numerous, distinct, 1-celled, 1-ovuled, becoming achenes; leaves strongly nerved with transverse veinlets; flowers paniced or verticillate; long pedicelled.

Flowers perfect, small, in panicles; carpels in a ring	1. Alisma.
Flowers monœcious, large, in whorls; carpels in a head	2. Sagittaria.

1. ALISMA (WATER-PLANTAIN)

Scape with whorled, paniced branches; petals 4 mm. long or less, involute in the bud; stamens 6, achenes flattened.

1. *A. Plantago-aquatica* L. Leaves ovate to elliptical, acute, rounded or cordate at base, the long-petioled scapes much longer, 3-9 dm. high; panicle large, pyramidal, the rays and slender pedicels ascending; petals 2-4 mm. long, white with a yellowish claw. Shallow water, ditches; common throughout N.A.

2. SAGITTARIA (ARROW-HEAD)

Marsh plants with milky juice, the scapes sheathed at base by the long petioles; leaves sagittate or lanceolate; flowers in whorls of 3, the lower pistillate, the upper staminate; stamens and carpels numerous; petals 7-14 mm. long; fruit a head of flat, winged achenes.

1. *S. latifolia* Willd. Scape 2-9 dm. high; leaves acute or obtuse, usually broad and sagittate, with long basal lobes, but variable; petals white, pedicels of the fertile flowers at least half the length of the fertile ones; one of the lower flowers sometimes replaced by a flowering branch; achene more broadly winged on one side, with a rather long, curved, horizontal beak more than $\frac{1}{4}$ its length. In water, or wet places. Sicamous; Lulu Island; Alaska. (*S. variabilis* Engelm. var.) This is the Wapato, the root of which was an important article of food with the Indians. The plant flowers in August.

2. *S. arifolia* Nutt. Scape 2-4 dm. high; leaf-blades sagittate-hastate, acute, with long basal lobes; pedicels subequal, achene winged all round bearing a small erect beak less than $\frac{1}{4}$ its length, on the inner side. In deep water producing lance-linear phyllodia at the base, and developing elongated petioles and floating narrow blades. (*S. cuneata* Sheldon.) Kootenay.

GRAMINEÆ (GRASS FAMILY)

Annual or perennial with hollow, terete stems (*culms*) jointed at the solid nodes; the blades parallel-veined; the sheath (lower part of the leaf) inclosing the culm and open on one side, usually with a transverse scale (*ligule*) at the throat; florets 1-several in spikelets, each floret consisting of 2 scales (the outer called the *lemma*, the inner next the rachilla, the *palet*) inclosing the pistil and the usually 3 stamens; spikelets arranged in panicles or spikes, each spikelet consisting of 1-several florets arranged on an axis called the *rachilla* and subtended at base by 2 scales called *glumes*; between the palet and the lemma there are often 2 minute scales called *lodicules*; florets sometimes unisexual; styles 2, often short or obsolete, stigmas plumose; lemmas sometimes sterile, i.e., not enclosing a pistil.

Key to Tribes

I. Spikelets 1-flowered, or if 2-flowered the lower flower staminate.

- Rachilla articulated below the glumes, which fall with the floret (spikelets deciduous entire).
 Lemma hyaline, much more delicate than the glumes; *phleum alopecurus*, *polypogon*, *cinna* in V. AGROSTIDEÆ.
 Lemma, not hyaline
 Spikelets flattened laterally.
 Glumes absent *Leersia* in II. OXYZEÆ.
 Glumes present, spikelets crowded in 2 rows, forming 1-sided spikes IV. CHLORIDEÆ.
 Spikelets not flattened laterally, glumes very unequal, apparently 3, (a sterile lemma simulating a glume present) fertile lemma and palet indurated, awnless I. PANICEÆ.
 Rachilla articulated above the glumes, which are persistent after the fall of the florets.
 Glumes apparently 4, i.e., 2 sterile, often linear, lemmas (mostly empty, sometimes staminate) present below the fertile floret. III. PHALARIDEÆ.
 Glumes 2.
 Spikelets all alike, fertile.
 Inflorescence of digitate 1-sided spikes. *Cynodon* in CHLORIDEÆ.
 Inflorescence not digitate, spikelets strictly 1-flowered IV. AGROSTIDEÆ.
 Spikelets of 2 kinds, fertile and sterile, 3 at each joint, inflorescence spike-like *Hordeum* in VIII. HORDEÆ.

II. Spikelets 2-many-flowered, lower flower pistillate.

- Inflorescence a panicle or raceme.
 Glumes usually longer than the first floret, lemmas usually with a bent dorsal awn (terminal in *Danthonia*; *Kaleria* and *Sphenopholis* generally awnless); rachilla prolonged beyond the uppermost floret (except in *Aira*). Spikelets 2-few-flowered VII. AVENEÆ.
 Glumes usually shorter than the first floret, lemmas awnless or with a straight apical awn, spikelets 2-many-flowered VII. FESTUCEÆ.
 Inflorescence a spike VIII. HORDEÆ.

Key to Genera

Tribe I.—PANICEÆ.

- Spikelets with an involucre of bristles, inflorescence spikelike 1. *Setaria*.
 Spikelets without such involucre.
 Glumes and lemmas awnless, inflorescence open, of distinct spikelets 2. *Panicum*.
 Sterile lemma usually awned, inflorescence a panicle of spikes 3. *Echinochloa*.

Tribe II.—OXYZEÆ.

- Only Genus 4. *Leersia*.

Tribe III.—PHALARIDEÆ.

- Sterile lemmas awned, bifid, larger than the fertile lemma; spikelets 1-flowered 5. *Anthoxanthum*.
 Sterile lemmas awnless.
 Sterile lemmas very narrow, reduced to hairy scales, shorter than the fertile lemma; spikelets 1-flowered 6. *Phalaris*.
 Sterile lemmas larger than the fertile lemma; spikelets 3-flowered, the terminal perfect 7. *Hierochloë*.

Tribe IV.—CHLORIDEÆ.

- Rachilla articulated below the glumes.
 Glumes unequal, narrow, keeled; spikelets much flattened, 6-14 mm. long 8. *Spartina*.
 Glumes equal, boat-shaped, convex; spikelets subterete, 3mm. long 9. *Beckmannia*.
 Rachilla articulated above the unequal, keeled glumes; inflorescence of digitate spikes 10. *Cynodon*.

Tribe V.—AGROSTIDEÆ.

- Lemmas with a long terminal awn and closely enveloping the grain.
 Fruiting lemma thin; membranaceous; panicle spikelike 11. *Muhlenbergia*.
 Fruiting lemma firm, indurated.
 Awns 3-branched 12. *Aristida*.
 Awns simple, twisted, persistent, long 13. *Stipa*.
 Awns simple, straight, deciduous, short 14. *Orizopsis*.
 Lemmas awnless or short-awned, the awn usually dorsal; the grain loosely enveloped except in *Oryzopsis*.
 Panicle a dense spike.
 Glumes not aristate, lemma dorsally awned; spike cylindrical 15. *Alopecurus*.
 Glumes abruptly aristate, lemma awnless; spike cylindrical 16. *Phleum*.
 Glumes long awned, lemma awned apically; spike narrowly ovoid 17. *Polypogon*.

- Panicle not a dense spike.
 Lemma 1-nerved, awnless; fruit a utricle, the pericarp readily opening at maturity 18. *Sporobolus*.
 Lemma 3-5 nerved, awned or awnless; fruit a grain
 Floret stipitate, stamen 1; callus without a tuft of hairs; lemma with a very short awn just below the apex 19. *Cinna*.
 Floret not stipitate, stamens 3.
 Callus with a long tuft of hairs; rachilla hairy 20. *Calamagrostis*.
 Callus naked; rachilla glabrous or slightly hairy.
 Lemma indurated, awned; glumes obtuse 14. *Oryzopsis*.
 Lemma thin, usually awnless; glumes acute 21. *Agrostis*.

Tribe VI.—AVENEÆ.

- Rachilla not prolonged behind the upper floret; spikelets 2-flowered, both florets perfect
 Rachilla minutely hairy; low plants 22. *Aira*.
 Rachilla villous 23. *Deschampsia*.
 Rachilla prolonged behind the uppermost floret.
 Spikelets 2-flowered with only 1 perfect floret, the other staminate.
 Lower floret perfect, awnless, the upper staminate with a hooked awn; plant soft pubescent 24. *Holcus*.
 Lower floret staminate, awned, the upper perfect, awnless 25. *Arrhenatherum*.
 Perfect florets 2 or more (*Deschampsia*, *Koeleria* and *Sphenopholis* are usually 2-flowered).
 Lemmas usually awnless.
 Glumes dissimilar, the second obovate and broader; articulation below the glumes 26. *Sphenopholis*.
 Glumes merely unequal, articulation above the glumes 27. *Koeleria*.
 Lemmas with a twisted awn arising between 2 terminal teeth; florets several; spikelets over 1 cm. long 28. *Danthonia*.
 Lemmas with a dorsal awn.
 Florets large, 15 mm. long 29. *Avena*.
 Florets less than 15 mm. long.
 Lemma erose, keeled, with a dorsal awn 23. *Deschampsia*.
 Lemma bidentate, or acute, convex; awn arising below apex 30. *Trisetum*.

Tribe VII.—FESTUCEÆ.

- Lemmas 3-nerved, sometimes 1-nerved.
 Leaves 2-3 cm. wide; rachilla with long hairs exceeding the floret 31. *Phragmites*.
 Leaves less than 1 cm. wide; rachilla smooth or the hairs short.
 Fertile floret surrounded by pectinate scales 32. *Cynosuros*.
 Fertile florets not so surrounded
 Glumes about equaling the first floret; inflorescence a dense shining spike 27. *Koeleria*.
 Glumes shorter than the first floret 37. *Poa*.
 Lemmas 5-nerved or more.
 Palet winged on the 2 keels 40. *Pleuropogon*.
 Palet not winged though often strongly keeled.
 Spikelets dioecious, palet strongly 2-keeled, lemma keeled at apex; low plants with saline or alkaline habitat 33. *Distichlis*.
 Spikelets not dioecious (except in some species of *Poa*).
 Lemmas keeled, more or less compressed.
 Lemmas shortly awn-pointed, spikelets in dense capitate, 1-sided clusters 34. *Dactylis*.
 Lemmas not awn-pointed, in some species cobwebby at base. 37. *Poa*.
 Lemmas awned, inflorescence open, spikelets not clustered 38. *Bromus*.
 Lemmas convex, rounded on the back or keeled only at apex.
 Lemmas not awned, very obtuse and scarious at apex, usually 3-4 mm. long.
 Nerves of lemma prominent 35. *Glyceria*.
 Nerves of lemma not prominent 36. *Puccinellia*.
 Lemmas mostly acute, often awned, usually more than 4 mm. long.
 Stigmas arising below the apex of the ovary; lemma bifid or entire, usually awned just below the apex 38. *Bromus*.
 Stigmas apical.
 Upper lemmas not convolute about each other, nor hooded.
 Lemmas 7-9-nerved, awned just below the bidentate apex, sometimes with a ring of stiff hairs at base 39. *Melica*.
 Lemmas entire 5-nerved, often terminally awned 41. *Festuca*.
 Upper sterile lemmas convolute about each other and more or less hooded 39. *Melica*.

Tribe VIII.—HORDEÆ.

- Spikelets solitary at each joint of the rachis; 2-many-flowered 42. *Lolium*.
 Spikelets placed with one edge to the rachis 43. *Agropyron*.
 Spikelets placed with the side to the rachis
 Spikelets 2 or more at each joint of the rachis.
 Spikelets all alike, 2-many-flowered 44. *Elymus*.
 Spikelets not all alike, mostly 1-flowered and in 3's, the lateral pair abortive, the central perfect; glumes awn-like 45. *Hordeum*.

1. SETARIA (BRISTLY FOXTAIL GRASS)

Spikelets as in *Panicum*, but surrounded below the articulation of the pedicels by persistent bristles; panicles dense, cylindrical, spike-like. (Latin *seta*, a bristle).

1. *S. viridis* (L.) Beauv. (GREEN F.) Annual, tufted, 2-9 dm. high; leaves 4-10 mm. wide; green; inflorescence 3-10 cm. long, about 1 cm. thick, dense, simple, with the spikelets in clusters or compound with very short branches, bristles at the base of each floret 1-3, upwardly barbed, 7-12 mm. long; spikelets 2 mm. long; lemma striate, slightly rugose, the second glume as long as the lemma, or nearly so. Intro.; Victoria; Vancouver; Armstrong.

2. *S. glauca* (L.) Beauv. (PIGEON GRASS). Annual, culms compressed, 3-10 dm. high; leaves glaucous, 4-8 mm. wide; inflorescence 3-10 cm. long, about 1 cm. thick, simple, the spikelets 3 mm. long, densely racemose; bristles 5-16, 3-8 mm. long, upwardly barbed; lemma transversely rugose, the second glume $\frac{2}{3}$ as long. Widely introd. in N.A.; perhaps in B.C.

3. *S. Italica* (L.) Beauv. (MILLET). Annual, 6-15 dm. high; blades 1-2.5 cm. wide, generally scabrous; panicle compound, 1-3 cm. thick, 1-1.5 dm. long, interrupted below; spikelets 3 mm. long; bristles 2 or 3, generally purplish, upwardly barbed, 7 mm. long or less; lemma slightly striate and rugose. Intro. Comox.

2. PANICUM (PANIC-GRASS)

Spikelets 1-flowered, in open panicles; glumes apparently 3, the third being a sterile lemma, which may enclose a palet; the 2 real glumes very unequal, the first often very small; the fertile lemma with inrolled margins, hard and shining, enclosing a similar palet; grain free. (The Latin name).

Spikelets obtuse (perennials).

Spikelets about 3 mm. long

Spikelets about 1.5 mm. long

Spikelets acute.

Annual, pubescent

Perennial, glabrous

1. *P. Scribnerianum*.

2. *P. occidentale*.

3. *P. capillare*.

4. *P. agrostoides*.

1. *P. Scribnerianum* Nash. Culms pilose, 2-6 dm. high, in late summer profusely branched; blades 6-10 mm. wide, smooth above, scabrous-pubescent beneath, ligule 1 mm. long; panicle 4-7 cm. long, ovoid, the primary short-exserted; spikelets 3-3.3 mm. long, turgid, glumes pubescent. Yale; Lakes, V. I.

2. *P. occidentale* Scrib. Culms more slender; the whole plant pilose, ligule 2-5 mm. long; spikelets pubescent, 1.5 mm. long; panicle long-exserted. (*P. dichotomum* var. *pubescens*) Kamloops; Cascades; Nootka.

3. *P. capillare* L. (WITCH GRASS). Annual, 3-6 dm. high, culms stout; sheaths papillose-hispid, blades 5-15 mm. wide, more or less pubescent; panicle large and diffuse, often half the entire plant, included at base; spikelets 2-2.5 mm. long, glabrous, long pedicelled. Fields, V. I. to Atlantic; about irrigation ditches in D. I. *P. miliaceum* L. (Millet). Similar, spikelets 5 mm. long. Occasional, New Westminster.

4. *P. agrostoides* Trin. Perennial, 4-10 dm. high, nearly glabrous; blades 5-10 mm. wide; panicle pyramidal, often purplish, (resembling that of *agrostis alba*) with stiff ascending branches somewhat appressed, naked below; spikelets 2 mm. long, a few hairs on the short pedicels and sometimes at the throat of the loose sheaths. Seemingly native at Sproat's Lake, V. I. (Macoun).

3. ECHINOCHLOA (BARNYARD GRASS)

Spikelets 1-flowered with 2 unequal glumes and a sterile lemma, as in *Panicum*; glumes spiny-hispid, mucronate; sterile lemma similar, awned or mucronate; fertile lemma and palet much as in *Panicum*; panicles of dense, 1-seeded spikes. (Greek *echinos*, a hedgehog, *chloa*, grass).

1. *E. crusgalli* (L.) Nash. Coarse, 3-12 dm. high, branching at base; panicle green or purplish, dense above, glabrous, blades 1-2 cm. wide, glabrous, scabrous above. Introd.; gardens and moist, rich soil. New Westminster.

4. LEERSIA (CUT-GRASS)

Spikelets 1-flowered, flattened laterally, sterile or fertile (the latter mostly included in the sheaths); glumes wanting; lemma boat-shaped, awnless; stamens 3; inflorescence composed of short racemes of imbricated spikelets in open panicles. (Leers was a German botanist).

1. *L. oryzoides* (L.) Sw. (RICE CUT-GRASS). Culms stout, 3-12 dm. high, the bases decumbent; blades very rough; spikelets 4-5 m.n. long; lemma hispid, bristly on the keel. Wet places Nfld. to Wn., perhaps in B.C.

5. ANTHOXANTHUM (SWEET VERNAL GRASS)

Spikelets 1-flowered in a narrow spike-like panicle; glumes very unequal; sterile lemmas 2-lobed, hairy, dorsally awned; fertile lemma awnless; stamens 2. (Greek *anthos*, a flower, *xanthos*, yellow).

1. *A. odoratum* L. Fragrant, 2-6 dm. high; panicle 3-8 cm. long, brownish-green; spikelets 8-10 mm. long, spreading in flower; the first sterile lemma short-awned below the apex, the second awned near the base. Introd. fields about coast cities. Flowering early.

6. PHALARIS (CANARY GRASS)

Spikelets 1-flowered, laterally flattened; panicle narrow or spike-like; glumes equal, boat-shaped, much longer than the florets; the sterile lemmas reduced to hairy scales, the fertile lemma and palet hard and shining in fruit. (Greek *phalaros*, shining, descriptive of the seed).

1. *P. canariensis* L. (CANARY GRASS). Annual, stems 3-6 dm. high; leaves scabrous, 5-10 mm. wide; panicle a dense, ovoid spike, 2.5-3.5 cm. long; glumes boat-shaped, white with green veins, nearly glabrous, the 2 empty lemmas small, slightly pubescent; fertile lemma appressed-pubescent. Waste places, New Westminster.

2. *P. arundinacea* L. (REED CANARY GRASS). Perennial, 6-15 dm. high; leaves 1-1.8 cm. wide; panicle 6-15 cm. long, short-branched, the flower clusters erect in fruit; spikelets lanceolate; glumes not keeled; sterile lemmas small hairy scales. Widely distributed from Atlantic to Pacific. (The var. *picta* L. is the Ribbon Grass of the garden).

7. HIEROCHLOË (HOLY GRASS)

Spikelets 3-flowered, the terminal perfect, with 2 stamens, the two lower with 3 stamens or consisting of empty lemmas; glumes boat-shaped, shining, about equaling the hairy lemmas. (Greek *hieros* holy, *chloë*, grass; strewn at church doors in Northern Europe).

1. *H. odorata* (L.) Wahlenb. Panicle pyramidal, with spreading or drooping branches; spikelets 5 mm. long, light brown. (*H. borealis* R. & S.) Thompson River, eastward and northward. Comox; Elgin.

8. SPARTINA (SLOUGH GRASS, CORD GRASS)

The 1-flowered spikelets strongly flattened, sessile in 2 rows in dense 1-sided spikes which form a raceme; glumes narrow, unequal, bristly, keeled, longer than the obtuse-narrow lemmas. Perennials with rootstocks and long tough leaves. (Greek *spartine*, a cord, in allusion to the tough leaves).

1. *S. gracilis* Trin. Slender, 3-9 dm. high; leaves mostly involute, attenuate into long tips; spikes 4-8 in number, 3-5 cm. long, appressed to the rachis, sessile or short peduncled; spikelets 6-9 mm. long. Wet places, D. I.; Kamloops.

2. *S. cynosuroides* (L.) Roth. Stout, 1-3 m. high; leaves involute, long-pointed; spikelets 12-14 mm. long; spikes 5-10 cm. long on peduncles 1 cm. or more long, in a dense oblong purplish raceme. Saline places, Wn. to N.S.; perhaps in southern interior, B.C.

9. BECKMANNIA (TALL SLOUGH GRASS)

The 1-flowered, strongly flattened spikelets closely imbricated in 2 rows in 1-sided spikes; rachilla articulated below the sub-equal, inflated, boat-shaped glumes; lemmas lanceolate, palet nearly as long. (Beckmann was a German botanist).

1. *B. erucæformis* (L.) Host. Culms 5-10 dm. high; leaves 5-8 mm. side, scabrous; panicle 1-2.5 dm. long, narrow, the crowded, somewhat appressed spikes 5-12 mm. long; spikelets circular, 3 mm. long; glumes transversely wrinkled. Wet ground, Lulu Island, D. I. and eastward.

10. CYNODON (BERMUDA GRASS)

Spikelets 1-flowered, flattened, sessile, in 1-sided spikes; rachilla prolonged; glumes unequal, narrow, keeled; lemma broad, boat-shaped, obtuse, ciliate on the keel, palet nearly as long, with 2 close, prominent, ciliate keels. Low with creeping rootstocks, leaves flat, narrow.

1. *C. Dactylon* (L.) Pers. Glabrous, culms flattened, 1-3 dm. high; panicle digitate with 4-5 spikes, 2-5 cm. long. Introd.; Nanaimo; Victoria.

11. MUHLENBERGIA (WILD TIMOTHY)

Spikelets 1-flowered, scarcely flattened, in contracted, somewhat spike-like panicles; glumes thin, awned (in ours); lemmas narrow, 3-nerved, awnless (in ours), closely enveloping the grain. (Muhlenberg was an American botanist).

1. *M. racemosa* (Michx.) B. S. P. Perennial, 3-9 dm. high; blades scabrous; panicle 5-10 cm. long, dense, interrupted below; glumes much longer than the acute lemma. (*M. glomerata* Trin). Moist meadows and grassy thickets, Coast to Rockies, and eastward.

12. ARISTIDA (TRIPLE-AWNED GRASS)

Spikelets 1-flowered; glumes unequal, acuminate; lemma including the thin palet, and terminating in a trifid awn with long branches. (Latin arista, an awn).

1. *A. purpurea* Nutt. Perennial, 3 dm. high, densely tufted; blades filiform, involute; panicle long, loose but narrow, of a few slender-pedicled spikelets; the first glume $\frac{1}{2}$ - $\frac{2}{3}$ the length of the second, which is 15-22 mm long; awns equal, 3-10 cm. long, generally diverging. Plains; D. I.; Naramata.

13. STIPA (FEATHER GRASS)

Spikelets 1-flowered, in narrow or loose panicles; glumes acute; callus long, hairy; lemma with a long twisted awn, indurated, closely enveloping the grain. Tufted perennials with involute leaves. (Greek *stýpe*, tow).

Glumes 2-3 cm. long; awns of lemma 10-20 cm. long.

Glumes 1.8-2.4 cm. long, panicle included at base 1. *S. comata*.

Glumes 2.4-3.5 cm. long, panicle exserted 2. *S. spartea*.

Glumes less than 12 mm. long, awns of lemma 5 cm. long or shorter.

Panicle a spike.

Glumes 7-9 mm. long 3. *S. viridula*.

Glumes 4-5 mm. long 4. *S. columbiana*.

Panicle loose 5. *S. Richardsonii*.

1. **S. comata** T. & R. (NEEDLE GRASS). Culms 2-10 dm. high, the upper sheaths often enclosing the base of the panicle; basal leaves half the length of the culm; panicle loose, 1-3 dm. long, the branches few-flowered, ascending; glumes 18-24 mm. long, exceeding the rather pubescent lemma; awn 10-20 cm. long, slender, pubescent to the bend; callus acute, pubescent at base. Dry ground, D. I.; Victoria.

2. **S. spartea** Trin. (NORTHERN BUFFALO GRASS). Culms 5-12 dm. high; basal leaves $\frac{2}{3}$ the length of the culms; panicle finally exerted, 1-3 dm. long, simple, narrow, branches erect; glumes 2.4-3.5 cm. long, acuminate, longer than the brown lemma, which is glabrous above and minutely pubescent below; awn stout, bent, 10-20 cm. long, scabrous, pubescent below; callus acuminate, silky. Kamloops.

3. **S. viridula** Trin. Rather stout, 5-10 dm. high, panicle greenish, dense spike-like, 1-2 dm. long; glumes somewhat equal, 7-9 mm. long, acuminate, exceeding the pale, pubescent lemma; awn usually twice bent, 2-4 cm. long, scabrous; callus short, not sharp; sheaths pilose at throat and margins; palet more than one-half as long as the lemma. Columbia Valley; D. I.; Victoria; Sask.

4. **S. columbiana** Macoun. Similar; panicle purplish, glumes unequal, purplish; lemma thinly pilose, 4-5 mm. long; awn 15-25 mm. long; callus acute; margins of sheaths not pilose; palet scarcely half as long as the lemma. Yale; Cedar Hill, Victoria.

5. **S. Richardsonii** Link. Slender, tufted, 6-9 dm. high; panicle loose and open, 7-15 cm. long, the branches very slender; glumes unequal, 7 and 9 mm. long; lemma brown, 5-6 mm. long, none less hairy; awn scabrous, 12-22 mm. long. Rockies; Donald; Golden.

14. ORYZOPSIS (MOUNTAIN RICE)

Spikelets 1-flowered in contracted or open panicles; glumes rather broad, obtuse or acuminate; callus short; lemma with a deciduous awn, indurated, convolute, enclosing the large palet and large grain. (Greek *oryza*, rice, *opsis*, aspect).

Panicle narrow.

Awn 5-10 mm. long

Awn shorter or wanting

Panicle open, ample

1. *O. asperifolia*.

2. *O. pungens*.

3. *O. hymenoides*.

1. **O. asperifolia** Michx. Culms tufted, 2-6 dm. high; blades scabrous, those of the culm often only 1 cm. long, the basal 4-8 mm. wide; tubular below; inflorescence 5-12 cm. long; simple; spikelets 6-8 mm. long; awn 5-10 mm. long; lemmas sparingly pubescent; lodicules $\frac{3}{4}$ the length of the palet; glumes 5-7-nerved. Rocky woods, Clinton; Field; Columbia Valley.

2. **O. pungens** (Torr.) Hitchc. Culms tufted, 2-5 dm. high; blades slightly scabrous, those of the culm short, the basal long, involute-filiform; panicle 3-6 cm. long, branches 1-2 cm. long; spikelets 3-4 mm. long; awn 1-2 mm. long, or wanting; lemma appressed-pubescent, glumes 3-5-nerved. Sandy soil, Spence's Bridge, eastward. Field.

3. **O. hymenoides** R. & S. (INDIAN MILLET). Culms tufted, 3-6 dm. high; blades smooth, those of the culm long, filiform; panicle 2-3 dm. long, widely branching and forking, the branchlets mostly bearing 2 spikelets 5-7 mm. long; lemmas densely pubescent. In large tufts, sand dunes, D. I.; Summerland.

15. ALOPECURUS (FOXTAIL GRASS)

Spikelets 1-flowered, early deciduous, flattened in a dense cylindrical spike, which is more slender than that of *Phleum*; glumes equal, awnless, somewhat united at base, ciliate on keels; lemma obtuse, 4-5-nerved, awned below the middle; palet often wanting; style single with 2 hairy stigmas. (Greek *alopex*, a fox, *oura*, a tail).

Annual, sheaths inflated, often enclosing the spike.

Perennial, sheaths slightly or moderately inflated, not enclosing the spike.

Culms decumbent at base; spikelets 3 mm. long, ligules 3-5 mm. long.

Culms erect.

Glumes obtuse; spikelets 3-4 mm. long; ligules 3-4 mm. long

Glumes acute; spikelets about 5 mm. long; ligules 1 mm. long

2. *A. saccatus*.

1. *A. geniculatus*.

3. *A. californicus*.

4. *A. pratensis*.

1. *A. geniculatus* L. Perennial, 1.5-6 dm. high, decumbent, geniculate at base; blades slightly scabrous, 8-15 cm. long; spike 2.5-6 cm. long; spikelets about 3 mm. long; the lemma shorter than the ciliate-keeled glumes; the awn inserted slightly below the middle, 5-8 mm. long. Moist meadows, B. C. to Nfld. Var. *aristulatus* Torr. Awn scarcely exserted, spikelets 2-5 mm. long, lemma slightly longer than the glumes. The commoner form.

2. *A. saccatus* Vasey. Annual, erect or slightly geniculate at base, 1-2 dm. high; the upper sheath inflated, usually enclosing the spike, blades rough, 2.5-6 cm. long; spike 2.5-5 cm. long; the margins of the lemma united to the middle, the awn inserted near the base, 6-12 mm. long. (*A. Macounii* Vasey) Drying rocks or pool margins, V. I.; Yale.

3. *A. californicus* Vasey. Perennial, geniculate below, 2-3 dm. high; sheaths loose, ligules 4 mm. long; leaves 2.5-12 cm. long, hispid above; spike 2.5-5 cm. long, the edges of the lemma united half way to the middle; awn inserted near the base, 4-6 mm. long. Ucluelet.

4. *A. pratensis* L. (MEADOW F.) Erect, 3-9 dm. high; blades scabrous, sheaths loose, the upper inflated; spike 5-10 cm. long; spikelets 5 mm. long; lemma equaling the acute long-ciliate glumes; awn exserted, 4-5 mm. Introd. Victoria; Nanaimo.

16. PHLEUM (TIMOTHY)

Spikelets 1-flowered, flattened, persistent in a dense cylindrical spike; glumes equal, ciliate on keels, awned; lemma shorter, hyaline, 5-nerved, truncate; stigmas plumose. (Greek *phleos*, a kind of reed).

1. *P. pratense* L. (COMMON TIMOTHY). Perennial, 6-12 dm. high; base bulbous; panicle 0.8-2 dm. long, awn of glumes 1 mm. long. Fields, everywhere.

2. *P. alpinum* L. Perennial, 2-6 dm. high; panicle 2-6 cm. long, narrowly ovoid-oblong; awn of glumes 3 mm. long. Alpine. Mt. Cheam, etc.; Alaska.

17. POLYPOGON (BEARD GRASS)

Spikelets 1-flowered in a spike clothed with the silky awns of the glumes; lemma much shorter than the glume, toothed at apex, short-awned; stamens 1-3; tufted annuals with flat leaves.

1. *P. Monspeliensis* (L.) Desf. Annual, 2-6 dm. high, bases decumbent; blades roughish; ligules obtuse; panicle spike-like, pale; glumes notched, the awn much longer than the body. Introd., waste places or sea shores.

2. *P. littoralis* Smith. Perennial, 2-6 dm. high, bases decumbent; leaves scabrous; ligules acute; spike somewhat interrupted, often purplish; awn equaling the glumes. Wet places. Victoria.

18. SPOROBOLUS (DROP-SEED)

Spikelets 1-flowered, (sometimes 2-flowered), awnless, small, in open or contracted panicles which are sometimes included at base or even altogether in the sheaths; glumes subequal or unequal, 1-nerved, somewhat shorter than the 1-nerved lemma; palet equaling the lemma; fruit a utricle, deciduous. (Greek *spora*, a seed, *ballein*, to throw).

Panicle contracted, spicate.

Glumes acute, $\frac{1}{2}$ - $\frac{1}{2}$ as long as the lemmas

Glumes acuminate, $\frac{2}{3}$ as long as the lemmas

Panicle open.

Spikelets 2-2.5 mm. long

Spikelets 1-1.5 mm. long

1. *S. Richardsonii*.

2. *S. brevifolius*.

3. *S. cryptandrus*.

4. *S. asperifolius*.

1. **S. Richardsonii** (Trin.) Mer. Perennial, 2-5 dm. high, erect culms, minutely roughened by septæ; ligule 2 mm. long, acute; spikelets 3 mm. long, crowded; panicle 1-6 cm. long, interrupted at base, long-exserted; lemma 3 mm. long. (*S. cuspidatus*, in part, *S. brevifolius*, Nash.) Meadows and along rivers, B.C. to Labrador, (Piper).

2. **S. brevifolius** (Nutt.) Scrib. Similar; culms smooth; ligule 0.5 mm. long, erose-truncate; panicle very slender, spikelets about 3 mm. long; lemma 3 mm. long, (*S. cuspidatus*). Dry open ground, Rockies. **S. depauperatus** Scrib. May be distinguished by the short lemma (1.7 mm. long) half as long as in the above. Rockies; Columbia Valley.

3. **S. cryptandrus** (Torr.) Gray. (SAND D.) Culms 4-7 dm. high; sheaths ciliate and bearded at the throat; panicle oblong-lanceolate, lead-colored, 12-20 cm. long, included at base in the sheath, sometimes ripening seed without being exserted; spikelets clothing the branches nearly to the base; pedicels short; the first glume $\frac{1}{3}$ as long as the second. Dry soil, Spence's Bridge; Penticton.

4. **S. asperifolius** Thurb. (ROUGH D.) Perennial, 1.5-4 dm. high; blades rough on upper surface; sheaths smooth; panicle pyramidal, 1 dm. long, included at base; spikelets mostly solitary, on long, capillary, often purplish, pedicels; glumes nearly equal. Dry or alkaline soil, Kamloops; Okanagan Valley.

19. CINNA (INDIAN REED GRASS)

Tall, with flat leaves, spikelets 1-flowered, the rachilla articulated below the glumes and prolonged a little behind the palet, the floret raised a little above them; glumes 1-and 1-3-nerved; lemma 3-5-nerved, usually short-awned near the apex; palet 1-2-nerved, stamen 1.

1. **C. latifolia** (Torr.) Griseb. Culms 5-15 dm. high, solitary or few, leaves 1-1.5 cm. wide; panicle 1.5-3.5 dm. long, the branches spreading or drooping; spikelets 4 mm. long; palet 2-nerved, equaling the scabrous short-awned lemma. (*C. pendula*). Damp woods, V. I.; Gold Range; Alaska.

20. CALAMAGROSTIS (REED BENT GRASS)

Spikelets 1-flowered in dense or open panicles; rachilla prolonged behind the palet; glumes subequal, longer than the lemma; lemma short-awned, usually below the middle; callus with a tuft of long hairs; rootstocks present. (Greek *kalamos*, a reed, *agrostis*, a grass).

Awn bent, callus hairs less than half as long as the lemma.	
Awn exceeding the glumes 2 mm. or more.	
Glumes scabrous all over	1. <i>C. purpurascens</i> .
Glumes scabrous on the keel or nearly smooth	2. <i>C. Vaseyi</i> .
Awn shorter than, or a very little exceeding, the glumes.	
Glumes keeled; western	3. <i>C. aleutica</i> .
Glumes not keeled; eastern	4. <i>C. rubescens</i> .
Awn straight, the callus hairs not much, if at all, shorter than the lemma.	
Panicle open.	
Spikelets 3.5 mm. long, awn hair-like	5. <i>C. canadensis</i> .
Spikelets 5-6 mm. long, awn a bristle	6. <i>C. Langsdorffii</i> .
Panicle spike-like after flowering.	
Callus hairs copious, lemma 4-toothed	7. <i>C. Scribneri</i> .
Callus hairs sparse.	
Culms 3 dm. high, panicle 4-6 cm. long	8. <i>C. crassiglumis</i> .
Culms and panicles longer.	
Leaves soft and narrow, more or less involute	9. <i>C. neglecta</i> .
Leaves rigid, flat.	
Panicle dense, spike-like	10. <i>C. hyperborea</i> .
Panicle narrow, but loose	11. <i>C. inexpansa</i> .

1. **C. purpurascens** R. Br. Culms 3-6 dm. high, with crowded dead sheaths at base; blades firm, scabrous, involute; panicle spike-like, 8-10 cm. long; glumes scabrous all over, purplish; awn 4-8 mm. long attached near base of obtuse lemma. (*C. sylvatica* D.C.) In large bunches, Alaska to California, subalpine; Field.

2. *C. Vaseyi* Beal. Similar; glumes nearly smooth, but scabrous on the keel; awn 3-4 mm. long, nearly straight; lemma 2-toothed. (*Deyeuxia sylvatica* Kunthe). Selkirks and Rockies; Mt. Stephen.

3. *C. aleutica* Trin. Tufted, 6-15 dm. high; leaves scabrous, flat or involute, ligule 3 mm. long, panicle little or much exserted, narrow, 1-4 dm. long, the branches crowded in 10-15 clusters; glumes 4-6 mm. long, strongly keeled, longer than the awn. (*D. brevistarata* Vasey). A tall sea-shore grass, West Coast, V. I.; and northward.

4. *C. rubescens* Buckl. More or less purplish throughout, 6-9 dm. high; leaves glaucous beneath, flat or involute, 1-3 dm. long, scabrous, panicle dense interrupted, not spike-like, 8-13 cm. long; glumes slightly rough; acute, the bent awn not exceeding the glumes; basal hairs in 2 tufts, less than half as long as the lemma. Dry slopes, Rockies. *C. Suksdorfii* Scrib. A related plant with a pale panicle, and hairs at base of lemma few or none. Armstrong to Rockies.

5. *C. canadensis* (Mich.) Beauv. (BLUE-JOINT GRASS). Culm 6-15 dm. high; ligule 3-6 mm. long; panicle purplish, 1-2 dm. long, dense, branches spreading or usually ascending, naked at base; spikelets 3-3.5 mm. long; awn delicate, hardly exceeding the erose-truncate lemma; glumes acute, hardly longer than the lemma, not closed in fruit. Damp meadows, widely distributed. Yale; Glacier; Lulu Island. Var. *acuminata* Vasey. Glumes acuminate, 4-5 mm. long, exceeding the acute lemma. Roger's Pass.

6. *C. Langsdorfii* (Link.) Trin. Similar to No. 5; panicle deeper, smaller; leaves more scabrous; glumes acuminate, longer than the toothed lemma, not closed in fruit; awn not so delicate, not exceeding the lemma. Moist meadows, Alaska to California; V. I. and eastward.

7. *C. Scribneri* Beal. Culms 6-9 dm. high; sheaths rough, bearded at summit; blades glaucous above; panicle 15 cm. long, lanceolate; spikelets 3-4 mm. long; lemma truncate, 4-toothed; awn rather stout, exceeding the glume, which is $\frac{1}{3}$ longer than the lemma, palet nearly as long as lemma. Wet meadows among bushes, Cascade Region.

8. *C. crassiglumis* Thur. Culms 3 dm. high, sheaths loose, longer than internodes; blades rigid; panicle 5 cm. long, dense; spikelets 3 mm. long; glumes subcoriaceous, acute; callus hairs $\frac{2}{3}$ as long as the glume; awn slightly longer than the glume. Lake shores, V. I.

9. *C. neglecta* (Ehrh.) Gært. Culms 4-6 dm. high, slender; blades soft, smooth, often narrow; panicle 5-10 cm. long, lobed or interrupted below; spikelets 3.5-4 mm. long; glumes acute; callus hairs little shorter than the truncate-toothed lemma; awn barely exceeding the lemma. Damp meadows, Coast to Rockies; Alaska.

10. *C. hyperborea* Lange. Culms 4-10 dm. high, stouter and more caespitose; blades rigid, roughish; panicle 7-20 cm. long, narrow; spikelets 3.5-4.5 mm. long; glumes acuminate, callus hairs $\frac{1}{8}$ - $\frac{3}{4}$ the lemma; awn almost as long as the glume, more or less bent. Alaska southward in mts.; Kootenay.

11. *C. inexpansa* Gray. Culms 7-12 dm. high; blades 1.5-3 dm. long, 3-5 mm. wide, scabrous above; panicle pale, 1-2 dm. long; spikelets 4 mm. long; glumes $\frac{1}{4}$ longer than the toothed lemma; awn equaling the lemma; callus hairs $\frac{3}{4}$ - $\frac{2}{3}$ the length of the lemma. Cameron Lake, V. I.; Rockies.

21. AGROSTIS (BENT GRASS)

Spikelets 1-flowered; the rachilla prolonged behind the palet in 2 species; glumes subequal, keeled, acute, longer than the obtuse, dorsally awned or awnless lemma; palet hyaline, shorter than the lemma or obsolete; panicle open or narrow with whorled branches. (Latin *agros*, a field).

Rachilla prolonged behind the palet.	
Spikelets 3 mm. long, rachilla long	1. <i>A. æqualvis</i> .
Spikelets 2.5 mm. long, rachilla short	2. <i>A. atrata</i> .
Rachilla not prolonged behind the palet.	
Palet evident, 2-veined.	
Alpine, 1-2 dm. high	3. <i>A. humilis</i> .
Not Alpine, 3-9 dm. high.	
Glumes pubescent, inflorescence spike-like	4. <i>A. verticillata</i> .
Glumes nearly or quite glabrous except on keel	5. <i>A. alba</i> .
Palet minute and nerveless or wanting.	
Panicle narrow, dense, the branches erect.	
Lemma with exserted awn.	
Sheaths inflated, the upper partly enclosing the panicle	7. <i>A. inflata</i> .
Sheaths not inflated, panicle not enclosed.	
Basal leaves flat, panicle dense	6. <i>A. microphylla</i> .
Basal leaves involute, panicle open	8. <i>A. canina</i> .
Lemma awnless or the awn included.	
Alpine, 1-2.5 dm. high	9. <i>A. Rossæ</i> .
Not alpine, 3-9 dm. high	10. <i>A. exarata</i> .
Panicle open.	
Panicle very diffuse with long branches	11. <i>A. hyemalis</i> .
Panicle not diffuse, branches 2-5 cm. long	12. <i>A. oregonensis</i> .

1. *A. æqualvis* Trin. Slender, erect, 3-6 dm. high; sheaths smooth; ligule 1-2 mm. long; blades nearly smooth; panicle narrow, 5-15 cm. long, often purple, the branches in half whorls; rachilla extending 0.6-1.5 mm. beyond the palet; lemma acute. Alaska to California; Roger's Pass.

2. *A. atrata* Rydb. Tufted, 1.5-3 dm. high, few-leaved; sheaths glabrous; ligules 1.5-2.5 mm. long, leaves 2 mm. wide, flat, smooth; panicle 5-8 cm. long, rather open, branches erect or ascending; spikelets dark purple, about 2 mm. long, glumes purple, nearly equal, abruptly acute or acuminate; lemma nearly as long, obtusish; palet slightly shorter; rachilla $\frac{1}{3}$ as long as the flower. Roger's Pass; Yoho Valley.

3. *A. humilis* Vasey. Tufted, a slender dwarf alpine species, 5-20 cm. high; ligules 1 mm. long or more; panicle narrow, 1-6 cm. long, red, the few branches erect; glumes smooth; lemma toothed, awnless. Mt. meadows, Alaska to Wn.; Mt. Garibaldi.

4. *A. verticillata* Vil. Decumbent at base, 3-6 dm. high; ligules truncate, 2-4 mm. long; blades scabrous, flat or finally involute; panicle dense, spike-like, 5-25 cm. long, often interrupted, the branches spikelet-bearing to the base; glumes scabrous on keel and minutely pubescent, 1.5 mm. long; palet $\frac{1}{2}$ to nearly as long as the minutely toothed, awnless, 5-nerved lemma. Introd. Victoria; Elgin.

5. *A. alba* L. (RED TOP). Culms 3-10 dm. high; often decumbent at base; from creeping rootstocks; ligules 4-5 mm. long, acute; blades flat, smooth or rough; panicle 5-30 cm. long, pyramidal, contracting after flowering, often purplish, branches naked on lower third; glumes scabrous on keel; palet $\frac{2}{3}$ as long as the 3-nerved lemma. Everywhere. Var. *vulgaris* Thurb. Panicle not contracting, ligule short, truncate. Dry ground, with species.

6. *A. microphylla* Steud. Annual, slender, 1.5-4 dm. high; ligules 2-4 mm. long, usually lacerate; blades 2-7 cm. long; panicle 3-8 cm. long, dense, the branches numerous, erect, 1 cm. long; glumes 3-4 mm. long, awn-pointed, hispid on keel; lemma with a dorsal awn 4-6 mm. long; palet wanting. Coast region. Var. *Major* Vasey. Stouter and larger in every way; panicle branches 2-5 cm. long. The common form at the Coast. Vancouver; V. 1.

7. *A. inflata* Scrib. Similar; culms rather stout, 1 dm. high, blades 2-4 cm. long, glumes awn-pointed, especially the second; spikelet 2-5 mm. long, lemma about half the length of the glumes, slender, awned on the back near the middle, the awn exceeding the glumes; callus minutely hairy on the anterior side. Victoria; Texada Island.

8. *A. canina* L. (BROWN BENT G.) Culms 2-6 dm. high, slender; basal leaves involute, those of culm flat, broader, panicle loose, contracting in fruit, the branches spikelet-bearing towards the ends; spikelets 2 mm. long,

glumes scabrous only on keel; awn bent, longer than the glumes; palet small or wanting. Alaska; introd. Victoria and eastern Canada.

9. *A. Rossæ* Vasey. Low, densely tufted, 10-25 cm. high; ligule 1 mm. long, acutish; blades narrow, slightly scabrous above; panicle 3-6 cm. long; the branches erect or ascending; glumes scabrous on keel; lemma 2-toothed, awnless; palet wanting. Alpine, nearly related to *A. humilis*.

10. *A. exarata* Trin. Culms 3-9 dm. high, glabrous, ligules 3-6 mm. long; blades scabrous; panicle contracted, often interrupted, 5-25 cm. long, the branches 2-7 cm. long, spikelet-bearing to the base; glumes scabrous, especially on the keel; lemmas awned or awnless; palet minute; variable, dwarf forms generally awned. Coast, eastward and northward; Glacier; Rockies.

11. *A. hyemalis* (Walt.) B. S. P. (HAIR GRASS). Culms very slender, erect, 3-12 dm. high; blades short and narrow or involute, scabrous; panicle diffuse, often very large, the lower branches 2-3 dm. long, the branches capillary, scabrous, spikelet-bearing at the ends; spikelets 1.5-2 mm. long; lemma awnless; palet wanting. (*A. scabra* Willd.). Either in sandy or wet places throughout B.C. Var. *geminata* Trin. Lower; panicle 1-2 dm. long; lemma dorsally awned, the awn not exerted. Cascades, Alaska to Wn.

12. *A. oregonensis* Vasey. Slender; leaves flat or involute, 5-8 cm. long, ligules 2-4 mm. long; panicle long-exserted, 5-10 cm. long, pyramidal, dark purple, its capillary branches ascending, 2-5 cm. long; lemma about $\frac{3}{4}$ as long as the glumes, acute, palet wanting; spikelets 2-2.5 mm. long. West Coast, V. I.

22. AIRA (HAIR GRASS)

Spikelets 2-flowered, both flowers perfect; rachilla not prolonged behind the upper palea; glumes thin, scarious, longer than the lemmas; both lemmas bidentate, awned (in ours), grain usually adherent to the palea and slightly indurated lemma. Rather low and delicate annuals. (The Greek name for some grass).

1. *A. caryophyllea* L. (SILVERY H.) Tufted, 2-4 dm. high; panicle open, 2-6 cm. long, the silvery spikelets 2 mm. long, clustered towards the ends of the spreading capillary branches; lemmas with a bent awn below the middle. Widely introd.

2. *A. præcox* L. (EARLY H.) Tufted, 0.5-1 dm. high; panicle narrow, 2-3 cm. long; spikelets yellowish or purplish, 3 mm. long; the awn of the lower floret shorter than that of the upper. Introd. Dry fields, V. I.; New Westminster.

23. DESCHAMPSIA (TALL HAIR GRASS)

Spikelets shining, 2-(sometimes 3-) flowered; rachilla hairy, more or less prolonged behind the upper palet; glumes keeled, subequal; lemma thin, 4-5-nerved, 2-4-toothed, dorsally awned. (Deslongchamps was a French botanist).

The second floret projecting beyond the glumes; panicle mostly broad and open

The florets not projecting beyond the glumes.

Awn bent, 6-12 mm. long (annual)

Awn straight, or less than 6 mm. long; (perennial)

Panicle medium, open; upper ligule 2-3 mm. long

Panicle elongated, narrow; upper ligule 6-7 mm. long

1. *D. caespitosa*.

2. *D. calycina*.

3. *D. atropurpurea*

4. *D. elongata*.

1. *D. caespitosa* R. Br. (TUFTED H.) Stout, tufted, 6-12 dm. high; basal leaves stiff, flat or becoming involute, 2-3 mm. wide; panicle 10-25 cm. long, pyramidal, the branches spikelet bearing at the ends; lower glume, 1-3 nerved, 3-4 mm. long; lemma smooth, awn from near the base, about equaling the lemma. Low land, Lower Fraser Valley; Comox; Alaska. Var. *longiflora* Beal. Panicle ample, spikelets 3-flowered, awns projecting, glumes 3-nerved. V. I. *D. alpicola* Rydb. Panicle 8-15 cm. long, open; spikelets 5 mm. long, awn 1.5-2 times as long as the glume. Alaska to California,

2. **D. calycina** Presl. Slender annual, 2-8 dm. high; leaves very narrow, ligules long; panicle 1-2 dm. long, simple, narrow, the ascending or erect branches naked below the middle, lower glume 6-8 mm. long, 3-nerved, the bent awn 6-12 mm. long, extending beyond the glumes. Victoria; Nanaimo; Kootenay.

3. **D. atropurpurea** (Wahl.) Scheele. (Mt. H.) Rather stout, 1-5 dm. high, not tufted; leaves flat, 3-6 mm. wide, ligules short; panicle 4-10 cm. long, branches few-flowered, ascending or spreading; glumes acuminate, purple, the lower 1-nerved, 5-6 mm. long, the bent awn 3-4 mm. long, inserted about the middle of the lemma, slightly projecting; the prolonged rachilla short or none. (Includes *D. latifolia* Vasey) Quesnel; Rockies and Selkirks; Mt. Benson; Strathcona Park; Alaska.

4. **D. elongata** Munro. (SLENDER H.) Slender, tufted, 2-6 dm. high; leaves very narrow, smooth; ligules 7 mm. long; panicle $\frac{1}{3}$ - $\frac{1}{2}$ the length of the culm; glumes 3-nerved, often purplish, longer than the florets; awn of lemma twice the length of the glume, inserted near base. Kootenay; Creston.

24. HOLCUS (VELVET GRASS)

Spikelets 2-flowered, articulated below the glumes; the lower floret stipitate perfect, awnless; the upper staminate, its lemma awned; glumes much longer than the rather indurated lemmas; rachilla prolonged behind the upper palet. (Greek *holcos*, attractive).

1. **H. lanatus** L. Softly pubescent, 3-8 dm. high; panicle whitish or purplish, 5-10 cm. long, loose; glumes pubescent, boat-shaped, awn hooked. A common introd. grass, fields and roadsides; rejected by cattle.

25. ARRHENATHERUM (OAT GRASS)

Spikelets 2-flowered, the lower floret staminate, its lemma with a bent awn inserted near the base; the upper floret perfect, short-awned from near the apex, or awnless; rachilla prolonged behind the upper palet; glumes unequal, thin; lemmas firmer. Tall perennials with narrow panicles. (Greek *arrhen* male, *ather*, an awn, from the awned staminate floret).

1. **A. elatius** (L.) Beauv. Culms 1 m. or more high; leaves 5-10 mm. wide, scabrous on both surfaces; panicle 15-30 cm. long, narrow, with short verticillate branches; spikelets 7-8 mm. long. (*A. avenaceum* Beauv.) Victoria; introd.

26. SPHENOPHOLIS

Spikelets 2-3-flowered, the rachilla extending behind the upper palet; pedicel articulated below the glumes, the rachilla also articulated between the florets; glumes 1- and 3-nerved, subequal, the second obovate, much the broader; lemmas awnless, or the second short-awned below the apex; palet hyaline; panicle rather narrow, the branches spikelet-bearing to the base. (Greek *sphen*, a wedge, *pholis*, a scale, from the obovate glume). *Eatonia*.

1. **S. obtusata** (Michx.) Scrib. Culms 3-10 dm. high; blades glabrous; panicle purple, 6-18 cm. long, densely flowered, interrupted, the branches in fascicles; spikelets 2.5-3 mm. long; glumes subequal, the second hooded, as broad as long, its margins shining. Gold Range. Var. **Koelerioides** Scrib. Lower; often pubescent, panicle shorter, green, hardly interrupted, cylindrical. Kamloops.

2. **S. pallens** (Spreng.) Scrib. Culms 3-10 dm. high; blades scabrous, sometimes pubescent; panicle nodding, loose, 8-20 cm. long; spikelets 3-4 mm. long; glumes unequal, scabrous on the keels, the first linear, the second oblanceolate; the second lemma sometimes awned below the apex. (*Eatonia pennsylvanica*). Kamloops. Var. **major** (Torr.) Scrib. Panicle narrowly lanceolate, rather densely flowered, the glumes subequal. B.C. to Wn. and Nfld.

27. KOELERIA (SHINING SPIKE-GRASS)

Spikelets 2-4 flowered, the rachilla prolonged beyond the upper palea; glumes 1- and 3-nerved, subequal, slightly shorter than the lemma; lemma with scarious margins, faintly 3-5-nerved, acute; palea hyaline; panicle spike-like. (Koeler was a German botanist).

1. *K. cristata* (L.) Pers. Culms 3-6 dm. high; lower sheaths retrorsely pubescent; blades becoming involute; panicle 0.8-2 dm. long, often shining, interrupted at base; glumes and lemmas scarious-margined, often scabrous on keels and margins; variable. Dry hillsides, V. I. to Kootenay.

28. DANTHONIA (WILD OAT GRASS)

Spikelets 3-many flowered; florets all perfect, or the upper staminate or rudimentary; glumes extending beyond the upper floret; lemmas 7-9 veined, deciduous, 2-toothed, with a bent, more or less twisted awn between the teeth; panicles small. (Danthoine was a French botanist).

Spikelets ascending in close panicles.

Callus very short, slightly hairy 1. *D. spicata*.
Callus elongate, hairy 2. *D. intermedia*.

Spikelets spreading in a loose panicle or solitary.

Sheaths smooth or slightly hairy, teeth of lemma 2-3 mm. long . . . 3. *D. californica*.

Sheaths hairy, teeth of lemma longer, bristle-like.

Spikelets 1-4, lemma narrowed abruptly 4. *D. americana*.

Spikelet usually 1, lemma tapering 5. *D. unispicata*.

1. *D. spicata* (L.) Beauv. Var. *pinetorum* Piper. (HILLSIDE O.) Culm 2-7 dm. high, basal leaves involute, 1-3 dm. long, sheaths hairy, at least below; panicle a simple raceme with few spikelets, which are about 12 mm. long, on short, ascending pedicels; lemmas 5 mm. long, purplish, the teeth tapering into awns 5-6 mm. long. Dry soil, Rockies to V. I., Revelstoke.

2. *D. intermedia* Vasey. Culms 1-4 dm. high; basal leaves involute; panicle with few spikelets, these 15 mm. long, rather crowded; glumes purplish; lemmas 7-8 mm. long, the teeth aristate; awn 7-8 mm. long. Meadows, Goldstream, V. I.; Columbia Valley.

3. *D. californica* Bol. Slender, 2-9 dm. high; sheaths silky-pubescent or glabrous, bearded at the throat; panicle simple, spikelets 3-10, 5-8-flowered; glumes purplish, 12-14 mm. long; lemmas tapering into teeth 2-3 mm. long, smooth except for a tuft of pilose hairs about the middle; awn equaling the lemma. Dry soil, V. I.

4. *D. americana* Scrib. Densely tufted, 2-4 dm. high; sheaths pubescent; panicles simple of 1-4 spikelets, 1-2 cm. long; glumes as long as the spikelets; lemmas 4-6 mm. long, narrowed abruptly into slender bristles; awn slender, 6-10 mm. long. Wellington, V. I.

5. *D. unispicata* Munro. (MOUNTAIN O.) Loosely tufted, 1.5-3 dm. high; sheaths with long, dense, white hairs; inflorescence usually a single terminal spikelet, 1-1.5 cm. long; glumes exceeding the spikelet; lemma 8-10 mm. long, tapering into 2 awns; central awn 8-12 mm. long. Dry soil, V. I.; D. I.; Arrowhead.

29. AVENA (OAT)

Spikelets 2-6 flowered, the rachilla bearded below the florets; glumes equal, longer than the lemmas; lemmas bidentate, awned or awnless, 5-11 veined; grain pubescent, at least at the summit. Annuals with open panicles of large spikelets. (The Latin name).

1. *A. fatua* L. (WILD OAT). Culms stout, in small tufts; spikelets pendulous, 2.5 cm. long; lemmas with brown hairs; awn bent and twisted, 2.5-4 cm. long, inserted about the middle of the lemma. Introd. in grain fields, a troublesome weed in the Fraser Valley. Var. *glabrata* Peter. Lemma smooth except for a ring of stiff hairs at base and the scabrous apex. Victoria; Departure Bay.

2. **A. sativa** L. (CULTIVATED OAT). Possibly derived from No. 1; 2-flowered; lemmas smooth, the lower with a straight weak awn (or awnless). The form with a more or less 1-sided panicle is *A. orientalis*.

30. TRISETUM (FALSE OAT)

Spikelets 2-5 flowered, rachilla hairy, prolonged behind the upper palet, or bearing a sterile floret; glumes unequal, shorter than the lemmas; lemmas 2-toothed, awned below apex, the awn usually twisted or bent. (Latin *tres*, three, *setum*, a bristle).

Panicle dense, spike-like, the awn 4-5 mm. long	1. <i>T. spicatum</i> .
Panicle loose or nodding, the awn 6-10 mm. long.	
Sheaths pubescent	2. <i>T. canescens</i> .
Sheaths smooth	3. <i>T. cernuum</i> .

1. **T. spicatum** (L.) Richter. Culms slender, 2-6 dm. high; sheaths and blades more or less pubescent or glabrous; panicle often interrupted below, shining, 3-12 cm. long; spikelets 5-6 mm. long; lemma minutely scabrous; awn 4-5 mm. long, divergent. (*T. subspicatum*) Mts.; Crow's Nest Pass; Alaska.

2. **T. canescens** Buck. Culms 6-9 dm. high; blades usually canescent; panicle narrow, 1.5-2 dm. long, the branches erect; lemma hairy at base, awn arising at base of cleft; first glume 5 mm. long. Rocky soil, V. I.; Agassiz.

3. **T. cernuum** Trin. Culms 6-9 dm. high; blades scabrous; panicle 1.5-2 dm. long, nodding, with ascending branches; lemma hairy at base, awn 6-10 mm. long; first glume 3 mm. long. V. I. to Kootenay, and northward.

31. PHRAGMITES (TALL REED GRASS)

Spikelets loosely 3-7-flowered, the rachilla clothed with long hairs; glumes unequal; lemmas 3-nerved, narrow, acuminate, the lowest the longest, and empty or staminate, the other florets perfect. Tall, coarse, reed-like grasses. (Greek *phragmites*, growing in hedges, in allusion to the tall hedge-like aspect).

1. **P. communis** Trin. Culms 2-4 m. high, leaves smooth, 1-5 cm. wide; panicle rather dense, but ample, 2-4 dm. long, red or tawny, the branches erect. Wet places, spreading by rootstocks, rarely ripening seed. Okanagan Valley; Elgin; and throughout temperate N.A.

32. CYNOSURUS (DOG'S TAIL GRASS)

Tufted; leaves flat; inflorescence, dense and spike-like; spikelets of 2 kinds in small clusters, the lower spikelets of many narrow, empty scales, the terminal of 2-4 broader scales; the lemmas 1-3 nerved, pointed or short awned. (Greek *küon*, a dog, *oura*, a tail).

1. **C. cristatus** L. Culms 3-6 dm. high, leaves glabrous; spike 5-10 cm. long, narrowly oblong, regular, glumes and lemmas pointed or short awned. Occasional in lawns and gardens. Vancouver, &c.

2. **C. echinatus** L. Spike ovoid, less regular; glumes and lemmas with awns of their own length. Introd.; Victoria; Nanaimo.

33. DISTICHLIS (ALKALI or SALT GRASS)

Spikelets diœcious, 8-16-flowered, flattened, in close panicles; glumes unequal, acute; lemmas broad, rigid, many-nerved; rootstocks large, scaly. (Greek *distichos*, two-ranked).

1. **D. spicata** (L.) Gr. Glabrous, 1-3 dm. high; leaves clearly 2-ranked, involute, pilose at base above the short ligule which is composed of a row of hairs; panicle 2-6 cm. long becoming yellow, especially inland; spikelets 6-15 mm. long, the florets imbricated. Salt marshes at Coast, and alkali flats in interior.

34. DACTYLIS (ORCHARD GRASS)

Spikelets about 3-flowered, flattened, nearly sessile in dense glomerules which form a rather open panicle; the unequal glumes and the 5-nerved, awn-pointed lemmas ciliate on keels; palea slightly shorter than lemmas. (Greek *dactylos*, a finger, in allusion to the digitate spikes).

1. **D. glomerata** L. A tall perennial, 9-12 dm. high; panicle with stiff ascending branches becoming erect in fruit; spikelets in 1-sided clusters. Roadsides and fields, common.

35. GLYCERIA (MANNA GRASS)

Spikelets few- to many-flowered, subterete or slightly compressed in narrow or spreading panicles; glumes unequal, shorter than the lemmas, which have slightly scarious margins or apex, and 5-9 strong nerves; palea equaling or longer than the obtuse lemma; style short. Mostly preferring water or wet ground. (Greek *glykeros*, sweet).

Spikelets 2-8 mm. long, ovoid or oblong.

Lemma 5-nerved, scarious-margined

Lemma 7-nerved, hardly, if at all, scarious-margined.

Second glume 1 mm. long

Second glume 2-2.5 mm. long

Spikelets 10-20 mm. long, compressed-cylindrical.

Spikelets 1.5-2 cm. long, subsessile

Spikelets 1-1.5 cm. long, on slender pedicels $\frac{1}{3}$ - $\frac{2}{3}$ as long

1. *G. pauciflora*.

2. *G. nervata*.

3. *G. grandis*.

4. *G. septentrionalis*.

5. *G. borealis*.

1. **G. pauciflora** Presl. Sheaths glabrous; panicle 2-3 dm. long, its branches ascending, firm, straight, naked below; glumes small, the second arose at the rounded apex, 3-nerved; lemma becoming brown; spikelets 2-3 mm. long. Moist ground, V. I.; Vancouver.

2. **G. nervata** Trin. (FOWL MEADOW GRASS). Leaves rough above; sheaths scabrous; panicle 2 dm. long, its branches slender, spreading or drooping, flexuous, naked below; glumes small, the second 1-1.5 mm. long, 1-nerved, acutish; lemma purplish, 1.7-2.2 mm. long; spikelets 3-4 mm. long. Common, Atlantic to Pacific; often in large clumps. Var. **elata** Nash. Taller, leaves rough on both sides; branches of panicle usually in pairs. Coast and Cascades.

3. **G. grandis** Wats. (REED MEADOW GRASS). Culms clustered, sheaths smooth or slightly scabrous; panicle large, 2-4 dm. long; spikelets purplish, 5-6 mm. long; glumes whitish, the second 3 mm. long, acute; lemma 2.5 mm. long. Wet places, throughout; Alaska.

4. **G. septentrionalis** Hitchc. Culms thick and soft, 1-1.5 m. high; panicle 2-2.5 dm. long, the branches spreading or erect; glumes obtuse; lemmas hispid all over, faintly 7-nerved, 4-6 mm. long. (*G. fluitans* am. auth. not R. Br.; the western form of *G. fluitans* (L.) R. Br.) Bogs or water, mostly in humid regions; Victoria; Columbia Valley.

5. **G. borealis** (Nash). Batch. Culms flattish, 3-9 dm. high; panicle 1.5-3 dm. long, often nearly simple, the branches erect; glumes subacute; lemmas strongly 7-nerved, 3.5 mm. long, minutely scabrous or glabrous with only the nerves hispid. Bogs or water throughout; Wn. northw.

36. PUCCINELLIA (SPEAR GRASS)

Spikelets as in *Glyceria*, lemmas firmer in texture, the 5 nerves not prominent, obtuse at apex, and minutely pubescent at base; styles wanting (distinct in *Glyceria*); mostly glaucous and saline. (Puccinelli was an Italian botanist).

1. **P. angustata** (R. Br.) R. & R. Culms 2-4 dm. high, with slender root-stocks, not tufted; leaves very narrow, flat or involute, smooth; panicle 3-8 cm. long, the base generally included in the upper sheath, narrow, the lower branches solitary, or in pairs, 1-2 cm. long; spikelets 2-4-flowered, 3-6 mm. long, lemmas 3 mm. long, or less. Alaska southward, along Coast.

2. *P. maritima* (Huds.) Parl. (SEA S.) Culms not tufted, 3-6 dm. high, with slender rootstocks; leaves flat or involute; panicles 8-20 cm. long, the lower branches 7 cm. long or less, solitary or in pairs, appressed or expanded; spikelets 4-10-flowered, 6-12 mm. long, lemmas 3-4 mm. long. Salt marshes, Alaska to Wn.; Victoria.

3. *P. distans* (L.) Parl. Tufted, culms 2-6 dm. high, without rootstocks; leaves flat or involute, panicle 3-15 cm. long, exserted, the lowest branches 4-6 at the node, spreading or deflexed, spikelet-bearing on the outer half; spikelets 2-6-flowered, 3-5 mm. long; lower glume less than half as long as the lowest floret. Seacoast and alkaline places in the interior. *P. Lemmoni* Scrib. Distinguished from this species by the lower branches, 3-4 at the node, and by the lowest glume more than half as long as the lowest floret. Occurs on the Coast, V. I.

37. POA (MEADOW GRASS, SPEAR GRASS)

Spikelets 2-6 flowered in open or dense panicles; glumes 1- or 3-, and 3-nerved, keeled; lemmas longer, herbaceous or membranaceous, often purplish, obtuse or acute, scariosus-tipped, 5-nerved, the 2 intermediate nerves often indistinct, often webbed at the base, i.e., furnished with a tuft of woolly hairs. In tufted species the rootstocks are erect, very short and apparently wanting. (Greek name for grass).

- | | |
|---|------------------------------|
| Annual, lemma not webbed, more or less villous below | 1. <i>P. annua</i> . |
| Perennial. | |
| Culms strongly flattened, lemma slightly or not at all webbed | 2. <i>P. compressa</i> . |
| Culms terete. | |
| Lemmas webbed at base. | |
| Marginal nerves of lemma glabrous. | |
| Sheaths and branches of panicle rough | 3. <i>P. trivialis</i> . |
| Sheaths and branches of panicle smooth. | |
| Branches at lower nodes of panicle mostly in 3's or 4's | 4. <i>P. Bolanderi</i> . |
| Branches of panicle in 2's | 10. <i>P. leptocoma</i> . |
| Marginal nerves of lemma not glabrous. | |
| Low, 1-3 dm. high, alpine. | |
| Panicle branches erect. | 5. <i>P. laxa</i> . |
| Panicle branches spreading. | |
| Leaves flat or folded, 2-3 mm. wide. | 6. <i>P. arctica</i> . |
| Leaves involute-filiform | 7. <i>P. cenisia</i> . |
| Taller, not alpine. | |
| Intermediate nerves of lemma obscure. | |
| Pubescence of lateral nerves of lemma evident, not appressed. | |
| Panicle 15-30 cm. long, drooping at apex | 8. <i>P. triflora</i> . |
| Panicle 4-12 cm. long, erect | 9. <i>P. nemoralis</i> . |
| Pubescence of lateral nerves of lemma none, or scanty and appressed | 10. <i>P. leptocoma</i> . |
| Intermediate nerves of lemma evident. | |
| Spikelets 6-9 mm. long, lance-ovate | 11. <i>P. occidentalis</i> . |
| Spikelets 4-5 mm. long, ovate. | |
| Lemmas glabrous on the intermediate nerves | 12. <i>P. pratensis</i> . |
| Lemmas pubescent throughout | 13. <i>P. Howellii</i> . |
| Lemma not webbed at base. | |
| Plants from rootstocks, not tufted. | |
| Spikelets 8-12 mm. long, culms stout. | |
| Leaves 4-8 mm. wide | 14. <i>P. eminens</i> . |
| Leaves narrow, involute | 15. <i>P. macrantha</i> . |
| Spikelets smaller, culms not stout, exc. in No. 18. | |
| Low, sea-shore plants, leaves involute | 16. <i>P. confinis</i> . |
| Tall, not maritime, leaves flat or folded. | |
| Panicle 5-12 cm. long, branches thinly flowered. | 17. <i>P. nervosa</i> . |
| Panicle larger, the branches flower-bearing to base | 18. <i>P. ampla</i> . |
| Plants without rootstocks, tufted. | |
| Lemmas villous on the nerves on the lower half. | |
| Alpine. | |
| Branches of panicle spreading | 6. <i>P. arctica</i> . |
| Branches of panicle erect or ascending. | |
| Leaves short, abruptly acute; glumes strongly curved | 19. <i>P. alpina</i> . |
| Leaves long, tapering at apex; glumes not strongly curved | 5. <i>P. laxa</i> . |

- Not distinctly alpine.
 Lemmas 3 mm. long, ligules hardly 1 mm. long . . . 20. *P. glauca*.
 Lemmas 4-5 mm. long, ligules 2-4 mm. long . . . 21. *P. Fendleriana*.
 Lemmas glabrous, merely pubescent or scabrous on the lower half.
 Low, a few cm. high; lemma glabrous below . . . 22. *P. Lettermanni*.
 Taller.
 Spikelets ovate, flattened; culms rather wiry, 2-4 dm. high, panicle dense . . . 23. *P. subpurpurea*.
 Spikelets lanceolate, not much flattened; panicle mostly rather dense.
 Culm stout to medium.
 Lemmas pubescent at least on the nerves of the lower half . . . 24. *P. Buckleyana*.
 Lemmas scabrous to nearly glabrous on the half . . . 25. *P. nevadensis*.
 Culms slender 26. *P. gracillima*.

1. *P. annua* L. (LOW SPEAR GRASS). Culms flattened, decumbent at base to erect, 1-3 dm. high; ligules short-pointed, 2-3 mm. long; sheaths loose; leaves flat, 2-4 mm. wide; panicle pyramidal; spikelets 3-5 mm. long, 3-5-flowered; lemma 5-nerved, slightly hairy at base and on the nerves below. Very common; roadsides.

2. *P. compressa* L. (CANADA BLUE GRASS). From creeping rootstocks, not tufted; decumbent at base; bluish green, 2-6 dm. high; ligule 1 mm. long; leaves 2-4 mm. wide, panicle 2-8 cm. long, flattish; spikelets 4-7 mm. long, 3-8-flowered; lemma 3-nerved, green, more or less bronzed at apex, nearly glabrous except on the pubescent mid-rib and margins, mostly with a few cobwebby hairs at base. Introd. everywhere.

3. *P. trivialis* L. (ROUGH MEADOW GRASS). Tufted, erect, retrorsely scabrous below the panicle, 3-9 dm. high; leaves 5-15 cm. long, sheaths and blades retrorsely scabrous, ligule 4-8 mm. long, acute; panicle with erect or spreading branches; spikelets 2-3 flowered; 3-4 mm. long; lemma 5-nerved, pubescent on the keel only. Resembling *P. pratensis* which, however, has smooth culms and sheaths. Fields, V. I.; Cloverdale. *Var. filiculmis* Scrib. Stem smooth, very slender, leaves 2-5 cm. long. Comox.

4. *P. Bolanderi* Vasey. Loosely tufted, smooth; ligules 3-4 mm. long; panicle 1 dm. long, with smooth, erect or spreading branches; spikelets 3-4 mm. long, 1-3-flowered; lemmas 5-nerved, nearly smooth except for the slight web at the base. Sooke, V. I.

5. *P. laxa* Hænke. Glabrous; in loose tufts, green, 2-4 dm. high; blades about 2 mm. wide, ligules 2 mm. long; panicle 3-10 cm. long, simple, often one-sided, the branches erect or ascending, spikelet-bearing at the ends; spikelets about 5 mm. long, lemma obtuse, pilose on margins and midrib at base, otherwise glabrous, intermediate nerves obscure; sparsely or not at all webbed. Mt. summits, Alaska to Wn.

6. *P. arctica* R. Br. Smooth or the leaves slightly rough, 2-3 dm. high; ligule 2-4 mm. long; leaves 10 cm. long or less, flat or folded, 2-4 mm. wide; panicle 3-9 cm. long, open, with spreading branches; spikelets 4-7 mm. long, ovate, lemma purplish, obtuse, pubescent on the lower half, often only slightly or not at all webbed; internerves long-pubescent, glumes glabrous except on midrib towards apex. Mt. Cheam; Mt. Stephen and northward to Alaska.

7. *P. cenisia* All. Smooth, slender, 1-3 dm. high; ligules 1-2 mm. long, panicle 3-10 cm. long, the branches generally spreading and more or less flexuous, 2-4 cm. long; spikelets 5-6 mm. long; lemmas faintly 5-nerved, the internerves short-pubescent below; web often scanty. Rockies.

8. *P. triflora* Gilib. (FOWL MEADOW GRASS). Culms rather stout, 3-12 dm. high; ligules 3-5 mm. long, truncate; leaves 2-4 mm. wide; panicle 1-3 dm. long, green or purplish, branches more or less spreading or ascending; spikelets 2-4-flowered, 4 mm. long; lemmas 2-3 mm. long, more or less webbed at base; pubescent on marginal and mid-nerves below. (*P. flava*, *P. serotina*). Moist ground. Common, Lulu Island; Okanagan; Skeena valley.

9. *P. nemoralis* L. Tufted, slender, 2-6 dm. high; smooth, ligules 1-2 mm. long, truncate; leaves 2 mm. wide, smooth or rough; panicle somewhat open, 0.5-1.2 mm. long, with erect or ascending branches; spikelets 2-5-flowered, 3-5 mm. long; lemma acute or obtuse, 2-3 mm. long, the marginal and mid-nerve silky-pubescent on the lower half, otherwise glabrous. Kootenay; Rockies.

10. *P. leptocoma* Trin. Panicle open, often flaccid, the few-flowered rays in 2's, filiform, very smooth; spikelets about 3-flowered, 4-6 mm. long; lemmas obscurely nerved, linear-lanceolate, acutish, somewhat villous on the keel; hairs of the mid-nerves and lateral nerves few and appressed or none; web scanty; ligule prolonged; roots fibrous. Alaska to Wn.

11. *P. occidentalis* V. & S. Tufted, without rootstocks; culms 5-8 dm. high, with 3-6 leaves, smooth or scabrous above; leaves flat 2-3 mm. wide, green; panicle 8-20 cm. long, the branches soon spreading often in 3's or 4's, more or less flexuous; spikelets 6-9 mm. long, lance-ovate, green or purplish; lemmas pubescent on the marginal and mid-nerves, slightly so between them, obtusish, web often slight. Roger's Pass; Rockies.

12. *P. pratensis* L. (JUNE GRASS). Culms 3-9 dm. high, from rootstocks, but more or less tufted; ligule 1.5 mm. long, obtuse; leaves 2.5 mm. wide; panicle 0.5-1.5 dm. long, pyramidal; spikelets 3-5-flowered, 3.5-4.5 mm. long; lemmas 3 mm. long, copiously webbed; sheaths and culm smooth. Fields and roadsides everywhere.

13. *P. Howellii* V. & S. Densely tufted, 3-6 dm. high; sheaths nearly smooth; ligules 4-5 mm. long; leaves 2-4 mm. wide; panicle rather loose and open, 1-2 dm. long, with erect branches; spikelets 4-5 mm. long, 2-5-flowered; lemma 3 mm. long, pubescent throughout, with few webby hairs at base. Dry woods, Goldstream.

14. *P. eminens* Presl. Glaucous, 3-9 dm. high; culms stout, from creeping rootstocks, leaves thick, 4-8 mm. wide; panicle heavy, 8-16 cm. long, contracted, spikelets 8-12 mm. long; lemmas 4-5 mm. long, distinctly nerved, pubescent at base on the lower part of the midrib and lateral nerves. West shore of V. I.; Alaska.

15. *P. macrantha* Vasey. Stout, 2-3 dm. high, with creeping rootstocks; leaves smooth, involute, curving outwards; ligule 1 mm. long, erose, sheaths loose; flowers about 5, diœcious or the lowest floret perfect; panicle 4-7 cm. long, dense, erect, yellow or slightly purplish; glumes 3-nerved; lemma 3-5-nerved or more, acute, thin, translucent, pubescent below, sparingly scabrous-pubescent or nearly glabrous except on the midrib above; lodicules prominent; palet emarginate. Sandy ground, Victoria.

16. *P. confinis* Vasey. Tufted, imperfectly diœcious, with long, running rootstocks; slender, 1-3 dm. high; ligules 0-2 mm. long; leaves involute, 1 mm. wide; panicle oblong, loose, 2-5 cm. long; spikelets slightly compressed, 4-6 mm. long; lemmas ovate, acute, 5-nerved, about 3 mm. long. In sand near the sea-shore, V. I.; Alaska to Oregon.

17. *P. nervosa* (Hook) Vasey. Smooth; culms 3-8 dm. high, slender, leaves green, 2-4 mm. wide; ligules 1-4 mm. long, panicle thin, 5-12 cm. long, loose, the branches spreading or erect, 2-7 cm. long; spikelets 4-9 mm. long, lemma lanceolate, minutely pubescent or scabrous on the more or less distinct nerves, and scabrous between them. Nootka; Mt. Cheam; Crow's Nest Pass. A common grass in the mountains and on foothills, apparently not distinct from *P. Olneyæ* Piper.

18. *P. ampla* Mer. Plants 6-10 or 15 dm. high, glabrous, from very stout rootstocks; leaves flat, linear; ligule truncate, 2 mm. long; panicle interrupted, purplish, 1-2.5 dm. long, 2-3 cm. in diameter, the branches erect, flower-bearing throughout; spikelets 7-8 mm. long, 3-flowered, glumes 3-

nerved; lemmas 4.5-5 mm. long, acute, rather prominently 5-nerved, minutely scabrous throughout, more scabrous on nerves and keel. Southern border, interior.

19. *P. alpina* L. Very densely short-tufted, 1-3 dm. high; ligule 1-2 mm. long; leaves short, 1-8 cm. long, flat, 2-6 mm. wide; panicle 2-5 cm. long, rather dense, ovoid, the lower branches spreading or ascending; spikelet rounded at the base by the strongly curved, broad glumes; lemma purplish, 4 mm. long, 3-nerved, pilose on the lower half, especially on the nerves, web none or very slight. Mts.; Crow's Nest Pass; Mt. Cheam; Alaska.

20. *P. glauca* Vahl. Glaucous, 2-6 dm. high; blades 3-5 cm. long, tapering at apex, 2 mm. wide; ligule short; panicle 3-7 cm. long, the branches ascending; spikelets often purplish, 5-6 mm. long; lemmas 3-3.5 mm. long, villous on keel and marginal nerves below, the intermediate nerves obscure. (*P. cæsia* Sm.) Spence's Bridge eastw. and northw.

21. *P. Fenderiana* (Steud.) Vasey. Culms tufted, scabrid or nearly smooth, 2-5 dm. high; cauline sheaths scabrid above; diœcious; panicle compact or somewhat spreading, 4-10 cm. long; spikelets 4-8-flowered, 6-8 mm. long; glumes minutely scabrid; lemma 4-5 mm. long, pubescent below on the keel and marginal nerves, the inter-nerves glabrous or nearly so. (*P. californica*) Dry hills, Spence's Bridge.

22. *P. Lettermani* Vasey. Low, 0.5-1 dm. high; leaves flat or folded, 2-3 mm. wide, sheaths loose; ligule 1-2 mm. long, obtuse; panicle dense, a few cm. long; spikelets 2-4-flowered, 3-4 mm. long; glumes two-thirds as long as the lemmas; lemmas smooth below, slightly scabrous on midrib at the apex, purplish, the intermediate nerves obscure; palet erose or 2-toothed. Mt. Garibaldi; Col.

23. *P. subpurpurea* Rydb. From strong rootstocks, but tufted; culm smooth or slightly scabrid, 2-4 dm. high; leaves 2 mm. wide, sheaths smooth; ligule 2 mm. long to obsolete; inflorescence often purple, close, 2-8 cm. long; spikelets 3-5-flowered, 5-6 mm. long, lemma acute or obtuse, minutely scabrid throughout, hispid-ciliate on keel, 5-nerved, 5-6 mm. long. (*P. purpurascens* Vasey). Mts.; V. I. to Rockies.

24. *P. Buckleyana* Nash. Culms stiffly erect, smooth or slightly rough under the panicle, 3-6 dm. high, ligules 3-4 mm. long; leaves roughish, 2 mm. wide, flat or involute; panicle 3-15 cm. long, narrow, the branches mostly in pairs, 1-5 cm. long, erect; spikelets 5-9 mm. long, purplish, subterete; glumes scabrous at apex; lemmas obtusish, pubescent on lower half, scabrous or smooth above. (*P. tenuifolia* Buck). Victoria; foothills of Rockies and Selkirks; Kootenay Lake.

25. *P. nevadensis* Vasey. Culms rather stout, 5-8 dm. high, scabrous below the panicle; ligules 2-4 mm. long; leaves glaucous, roughish, involute; panicle 10-15 cm. long, thin to rather dense branches 2-7 cm. long, erect or somewhat spreading; spikelets 5-9 mm. long, subterete, glumes more or less scabrous; lemmas minutely scaberulous, erose at apex, 5-7 mm. long, acutish. Esquimalt; Crow's Nest Pass.

26. *P. gracillima* Vasey. Often resembling a slender *P. Buckleyana*, tufted, slender, 3-6 dm. high; leaves short, flat or folded, rough; panicle thin, 5-10 cm. long, usually with erect branches, 3.5 cm. long or less; spikelets subterete or somewhat flattened, purplish, often loosely flowered, with evident rachilla joints, lemma pubescent below. Roger's Pass; Okanagan.

38. BROMUS (BROME GRASS)

Annuals, biennials or perennials, with flat leaves and large spikelets; glumes unequal, acute; lemmas longer, convex, sometimes keeled, 5-9-nerved, usually bifid at apex, awnless or awned from the base of the teeth; palet equaling or a little shorter than the lemma, 2-keeled or strongly 2-nerved. (Greek *broma*, food).

- Awns much longer than the lemma (Introd. plants).
 Lemma pubescent, awn 10-15 mm. long. 1. *B. tectorum*.
 Lemma scabrous.
 Culm pubescent above, awn 16-24 mm. long, panicle ovoid 2. *B. rubens*.
 Culm smooth, awn longer, panicle ample.
 Awns 35-45 cm. long. 3. *B. maximus*.
 Awns 30 mm. long or less 4. *B. sterilis*
 Awns short, or but little longer than the lemma
 Glumes at least 3- and 5-nerved respectively.
 Spikelets strongly flattened, lemmas keeled, (indigenous).
 Awns 3-6 mm. long, the panicle erect 5. *B. marginatus*.
 Awns mostly longer than 6 mm.
 Lemma glabrous to glabrate, except on the scabrous nerves
 Lemma very pubescent, the pubescence somewhat obscuring
 the scabrous nerves.
 Branches of the panicle ascending 7. *B. carinatus*.
 Lower branches of the panicle spreading, drooping or
 deflexed 8. *B. sitchensis*.
 Spikelets sub-terete, lemmas broad, almost elliptical, (introd.)
 Awns wanting, lemma very broad 9. *B. brizæformis*.
 Awns present.
 Lemmas pubescent—pilose 10. *B. hordeaceus*.
 Lemmas glabrous, or nearly so.
 Margin of lemma involute in fruit, palet long 11. *B. secalinus*.
 Margin of lemma not involute, palet short
 Lemma 7 mm. long 12. *B. racemosus*.
 Lemma 9 mm. long 13. *B. commutatus*.
 Glumes 1- and 3-nerved respectively, or sometimes both 3-nerved;
 lemmas lanceolate (indigenous).
 Rays of panicle erect or spreading, lemmas hispidulous, awn
 4-12 mm. long 14. *B. Orcuttianus*.
 Rays of panicle erect; lemmas pubescent.
 Panicle purplish 15. *B. Macounii*.
 Panicle not purple.
 Awn 2-4 mm. long, lemmas unevenly pubescent, (Sub-
 Alpine) 16. *B. Pumpellianus*.
 Awn 5-12 mm. long, lemmas evenly pilose-pubescent 17. *B. eximius*.
 Rays of panicle or at least the spikelets more or less drooping,
 lemmas pubescent.
 Glumes smooth.
 Leaves pilose on both sides, or nearly glabrous 18. *B. ciliatus*.
 Leaves scabrous above, glabrous below 19. *B. Richardsonii*.
 Glumes pubescent 20. *B. pacificus*.
 Panicle branches erect, lemmas glabrous, very obtuse 21. *B. inermis*.

1. *B. tectorum* L. Annual, tufted, 2-6 dm. high; sheaths and leaves pubescent; panicle 5-20 cm. long, open, the branches and spikelets drooping, somewhat secund; spikelets 5-8-flowered, 13-20 mm. long; lemma 8-12 mm. long, 7-nerved, hirsute. Introd. Very abundant in the dry region along the Fraser and the Thompson; Penticton.

2. *B. rubens* L. Tufted annual, 2-3 dm. high; sheaths pubescent; leaves pubescent on both sides; panicle compound, ovoid, usually purplish, 5-7 cm. long, spikelets 2.5 cm. long; glumes 1- and 3-nerved; lemmas 5-nerved, scabrous, deeply cleft at apex. Nanaimo.

3. *B. maximus* Desf. Very like the following: panicle more erect and compact; lemmas longer and broader; spikelets and awns attaining a length of 4-5 cm. V. I.

4. *B. sterilis* L. Annual, tufted, 3-8 dm. high; leaves pilose; panicle 2 dm. long, broad and open, the branches drooping, usually bearing but 1 spikelet 2.5-3.5 cm. long; lemma scabrous on the nerves, awn 2-3 cm. long. Introd. V. I. and eastward.

5. *B. marginatus* Nees. Culms rather stout, 6-12 dm. high; pubescent or puberulent above; sheaths pilose at least below; leaves sparingly pilose, scabrous, 6-12 mm. wide; panicle sometimes pilose at nodes, erect; narrow, 1-2.5 dm. long; spikelets 2-3 cm. long, some often sessile at the nodes; glumes acute or the second obtusish, scabrous-pubescent or nearly glabrous, the second 3-7-nerved; lemmas pubescent, 5-9-nerved; stout awn 4-6 mm. long. V. I. to Rockies; Comox. Common in Kootenay. More pilose forms with narrower somewhat involute pilose leaves may be referred to *B. subvelutinus* Piper.

6. *B. Hookerianus* Thurb. Tall and stout, nearly or quite glabrous, except at the throat of the sheaths and on the margins near the base of the leaves; the lower branches of the large inflorescence erect, spreading or drooping; glumes 4-5 and 6-8-nerved; lemmas with 7 distinct nerves, and 2 indistinct or short, marginal nerves; pubescence none or short, not at all obscuring the scabrous nerves; awn 5-10 mm. long. Common at the Coast. Probably best considered as a var. of the next.

7. *B. carinatus* H. & A. Stout, sheaths pubescent at least below; leaves 5-10 mm. broad, more or less pilose on both sides, or the upper glabrous; spikelets 3-4 cm. long; rays of the panicle erect, ascending, or sometimes spreading; glumes acuminate, 3- and 5-nerved, lemmas 5-7-nerved, pubescent, often hardly scabrous on the lateral nerves, slender awns 5-9 mm. long. Kootenay; V. I.; Crescent.

8. *B. sitchensis* Bong. Culm stout, 6-12 dm. high; nodes and sheaths more or less pubescent or glabrous; ligules 3-5 mm. long; leaves sparingly pilose above and on the margins near the base; the lower branches of the large inflorescence deflexed; spikelets 2.5-3.5 cm. long, excluding the awns; glumes 3- and 5-7-nerved; lemma 7-nerved, the slender awn 8-15 mm. long, pubescent, the nerves scabrous; palea about equaling the lemma. Near the Coast; Victoria; Mud Bay; Alaska.

9. *B. brizæformis* F. & M. Culms 2-6 dm. high; sheaths and leaves pubescent; panicle 4-15 cm. long, the branches ascending; spikelets few, flattened, 1.5-2.5 cm. long; lemma 9-nerved, nearly as broad as long, 7 mm. long. Introd. Kootenay.

10. *B. hordeaceus* L. (SOFT CHESS). Culms 1-6 dm. high, the whole plant pubescent; panicle erect, narrow; spikelets 6-10-flowered; 2.5-3 cm. long; lemma 10-12 mm. long, thickly pubescent; awn 5-10 mm. long. (*B. mollis*). Introd. fields and waste places, V. I., eastward.

11. *B. secalinus* L. (CHESS). Culms 4-9 dm. high; sheaths glabrous, strongly nerved; panicle open with drooping branches; spikelets 5-12-flowered, glabrous; lemmas 1 cm. long, the florets rather distant. Introd.

12. *B. racemosus* L. Culms 1-6 dm. high; sheaths pubescent; panicle not more than 10 cm. long, open, often reduced to a single spikelet in low forms; spikelets 5-8-flowered, glabrous or minutely pubescent, lemmas 7 mm. long, awn 4-6 mm. long. Introd. Very common V. I., eastward.

13. *B. commutatus* Schrad. Similar; panicle open, drooping, as much as 1.5 dm. long; awns usually larger; florets more closely imbricated than in *B. secalinus*. Victoria; Cowichan Lake.

14. *B. Orcuttianus* Vasey. Culms 3-6 dm. high; sheaths pubescent; leaves nearly glabrous; panicle thin, 1-1.5 dm. long, the rays erect or somewhat spreading, spikelets 4-7-flowered; glumes linear, lemmas scabrous or short-pubescent, 12-14 mm. long, 5-7-nerved. Oak woods, Victoria.

15. *B. Macounii* Vasey. Closely resembling *B. erectus* Huds., but with a smaller purplish panicle. *B. erectus* has sheaths nearly glabrous, blades sparingly pilose, lemmas evenly scabrous-pubescent, acuminate, awn 5-6 mm. long. Not uncommon on dry hills. Nanaimo; Cedar Hill, Victoria; also in lat. 62° in the North West.

16. *B. Pumpellianus* Scrib. Not very stout, from creeping rootstocks; sheaths smooth or sparingly pubescent, usually with 2 tufts of hairs at the throat; leaves smooth below, scabrous or pubescent above; panicle erect, thin, narrow, 1-2 dm. long; spikelets 5-8-flowered; glumes lanceolate, glabrous; lemmas short-pubescent on the nerves, long-pubescent towards the margins and base. Mts., Columbia Valley; Field.

17. *B. eximius* Piper. Culms 5-9 dm. high; sheaths glabrous, ligules 3-4 mm. long, leaves glabrous; panicle light; spikelets 1.5-2 cm. long, 4-6-flowered, the first glume narrow, the second broader; glumes and lemmas

pubescent, lemmas acute, 1 cm. long, the margin inrolled. West of Coast Range; V. I. Var. **robustus** (Shear.) Piper. Culms, leaves and sheaths pubescent, panicle often fuller, nodding, 1 dm. long. Kootenay to Coast. (*B. vulgaris* Shear. in part).

18. **B. ciliatus** L. Culms 6-12 dm. high; sheaths pubescent; panicle open, its branches spreading or drooping, 1-2.5 dm. long; spikelets 5-10-flowered, 2-2.5 cm. long; lemma 5-7-nerved, obtuse, or acute 8-12 mm. long, appressed-pubescent on the margins, smooth on the back, awn 4-8 mm. long. Damp meadows and thickets, V. I.; Columbia Valley.

19. **B. Richardsonii** Link. Stout, 6-12 dm. high; tufted, sheaths mostly glabrous except at the throat; panicle 15-25 cm. long, with drooping spikelets, 6-11-flowered, 2-3 cm. long; glumes glabrous; lemma 7-nerved, 12-15 mm. long, unevenly appressed-pubescent; awn 3-5 mm. long. Columbia Valley.

20. **B. pacificus** Shear. Stout, 6-9 dm. high; pubescent at the nodes, sheaths usually pubescent, leaves sparingly pubescent, scabrous beneath, panicle dense, drooping, the lower branches secund; spikelets 2.5-3 cm. long, coarsely pubescent, lemmas evenly pubescent, inconspicuously 7-nerved. Oregon to Alaska, along the Coast.

21. **B. inermis** Leyss. (HUNGARIAN B.) Tufted, 6-10 dm. high; sheaths glabrous; leaves 4-6 mm. wide, smooth, or nearly so, glabrous; panicle 1.5-2.5 dm. long, oblong, the branches ascending, spikelets 2-2.5 cm. long; 7-11-flowered, about 5 mm. wide; lemma glabrous or nearly so, obtuse, awnless or short-awned, 10-12 mm. long. Introd., Victoria; Okanagan.

39. MELICA (MELIC GRASS)

Spikelets rather large, 2- several-flowered, with several empty lemmas at the apex often convolute about each other; glumes large, often purple, unequal, membranaceous, scarious at apex; lemmas 7-13-nerved, awnless or awned just below the apex; panicles usually narrow. (Latin *mel*, honey).

Lemmas bidentate, usually awned.

Awns of lemma 3-10 mm. long.

Panicle narrow, lemma scabrous

Panicle branches spreading; sterile lemmas like the fertile.

Lemmas glabrous

Lemmas with a hairy ring at base

Lemma awnless or short awned; panicle narrow

Lemmas not bidentate, awnless; culms with bulbous bases.

Lemmas long-acuminate.

Lemmas acute, often obscurely bidentate

Lemmas obtuse

1. *M. aristata*.

2. *M. Smithii*.

3. *M. striata*.

4. *M. Hartfordii*.

5. *M. subulata*.

6. *M. spectabilis*.

7. *M. bulbosa*.

1. **M. aristata** Thurb. Tufted, 6-12 dm. high; leaves 5-10 cm. long, 6 mm. wide, panicle 1-3 dm. long, the branches erect; spikelets pale or purplish, 3-5-flowered; lemmas scabrous, with stiff marginal hairs near base; awn 6-10 mm. long. Valleys of Selkirks.

2. **M. Smithii** (Porter) Vasey. Tufted, 6-12 dm. high; leaves 10-20 cm. long, 6-12 mm. wide; branches of panicle solitary, somewhat spreading; spikelets 3-6-flowered, purplish-chestnut, about 2 cm. long; awn $\frac{1}{3}$ - $\frac{1}{2}$ as long as the lemma. Woods; Lake Superior to Wn.

3. **M. striata** (Michx.) Hitchc. Similar; more slender, leaves narrower, the ligule sheathing the culm; spikelets purple, 2.2-2.5 cm. long, the florets short-bearded at base; awn as long as the lemma or longer. Columbia Valley, northw.

4. **M. Hartfordii** Bol. Culms rather wiry, 3-9 dm. high; leaves 2-6 mm. wide; panicle 1.5-2 dm. long, the branches appressed, unequal; spikelets erect, 4-8-flowered; lemmas minutely silky throughout, pilose on the marginal nerves below the middle. Oak woods, V. I. Var. **tenuior** Piper. Low, 2-3 dm. high; panicle 3-8 cm. long, spikelets about 3-flowered. V. I.

5. *M. subulata* (Griseb.) Scrib. Culms slender, 6-9 dm. high; panicle 1-3 dm. long, the branches erect or spreading; spikelets 3-5-flowered, glumes purplish, lanceolate; lemmas long-acuminate, 10-15 mm. long, exceeding the glumes, hirsute on the nerves. Open woods, Coast region; New Westminster; V. I.; Alaska. (*M. acuminata* Bol.)

6. *M. spectabilis* Scrib. Stoloniferous, not tufted, about 7 dm. high; panicle nodding, 1-2 dm. long, the branches erect or spreading; spikelets 5-10 mm. long, shining, slender-peduncled, often nodding, 3-8-flowered; glumes ovate, shorter than the acute or obscurely toothed lemmas. Dry interior eastw.

7. *M. bulbosa* Geyer. Culms 3-9 dm. high; leaves short and convolute; panicle 1-2 dm. long, the branches mostly in pairs, erect, and unequal; spikelets shining, 2-3-flowered, about 8 mm. long, lemmas obtuse, roughish, about equaling the glumes. Dry interior and Rockies.

40. PLEUROPOGON

Spikelets large, 8-15-flowered, in a simple raceme; glumes purplish, very much shorter than the 5-7-nerved, awned lemma; palet ciliate, with 2 winged keels. (Greek *pleuron*, side, *pogon*, a beard, in allusion to ciliate palet).

1. *P. refractum* Vasey. About 6 dm. high; leaves 5-6 mm. wide; inflorescence 2-3 dm. long; spikelets 2-5 cm. long, 2.5-5 cm. apart; finally reflexed; awn 6-9 mm. long, arising from the blunt erose apex of the lemma. Wet woods, Port Moodie and North Arm, Burrard Inlet. (A. J. Hill).

41. FESTUCA (FESCUE GRASS)

Spikelets 2- many-flowered; glumes unequal, 1- and 3-nerved; lemma firm in texture, convex, more or less distinctly 5-nerved, mostly acute, tapering into an awn; palet about as long as the lemma. (The Latin name for some grass).

Annuals, stamen 1, included.

Spikelets densely 5-13-flowered 1. *F. octoflora*.

Spikelets loosely 1-5-flowered.

Branches of short panicle divergent, 2. *F. pacifica*.

Branches of panicle erect.

Lower glume $\frac{1}{4}$ - $\frac{1}{2}$ as long as the upper.

Lemma ciliate 5. *F. megalura*.

Lemma not ciliate 4. *F. myuros*.

Lower glume $\frac{2}{3}$ - $\frac{3}{4}$ as long as the upper 6. *F. bromoides*.

Perennials, stamens 3, exserted.

Sheaths smooth, or awn equaling or shorter than the lemma.

At least some of the leaves involute.

Blades not falling from the lower sheaths.

New shoots arising outside the leaf-sheaths; spikelets more or

less glaucous; from rootstocks

New shoots arising within the leaf-sheaths, spikelets mostly 7. *F. rubra*.

green; plants densely tufted.

Awn equaling or slightly longer than the lemma 8. *F. occidentalis*.

Awn shorter than the lemma 9. *F. ovina*.

Lower blades at length falling from the lower sheaths; basal

leaves 1-5 dm. long 10. *F. Hallii*.

Leaves flat, awns short or usually wanting 11. *F. elatior*.

Leaves flat, sheaths roughish; lemma long-awned.

Florets long-stipitate 12. *F. subuliflora*.

Florets not long-stipitate 13. *F. subulata*.

1. *F. octoflora* Walt. Slender, 1-4 dm. high; sheaths sometimes pubescent, shorter than the internodes; panicle simple, or narrow, the short branches erect; spikelets flat, 5-13-flowered; the first glume $\frac{3}{4}$ as long as the second; lemma 3-4 mm. long, scabrous, longer than the awn, though long-awned forms also occur; palet lanceolate. Dry soil, Victoria; D. I., and throughout temperate North America.

2. **F. pacifica** Piper. Slender, 1-4 dm. high; sheaths often puberulent, shorter than the internodes; panicle 2-10 cm. long, simple or secund with spreading branches; lemmas more or less scabrous, 5-6 mm. long, awn 10-15 mm. long; palet 2-toothed, longer than the lemma, the inflexed sides broad. Dry hillsides; V. I.; Black Mt., Vancouver.

3. **F. reflexa** Buckl. Similar; all the spikelets spreading, usually 1-3-flowered, lemmas glabrous or more or less scabrous, 4.5-6 mm. long, awn 2-12 mm. long; the inflexed sides of the palet narrow. Dry hills, V. I.

4. **F. myuros** L. Glabrous, 2-6 dm. high; sheaths smooth, longer than the internodes; panicle narrow, 7-20 cm. long, the erect, appressed branches solitary; spikelets narrow, 4-5-flowered, on stalks 1-2 mm. long; the first glume much less than half the second; lemmas scabrous above, 5-6 mm. long, the awn twice as long; palet shorter than the lemma; stamen 1. Introd. V. I.

5. **F. megalura** Nutt. Similar; panicle more or less secund, often not exserted, spikelets short-stalked, first glume usually very short, lemmas scabrous and ciliate, the awns 3 times as long. Common about Victoria and Crescent.

6. **F. bromoides** L. Glabrous, 1-3 dm. high; sheaths smooth, longer than the internodes; panicle dense, narrow, 5-10 cm. long, branches solitary, appressed; spikelets 4-5-flowered, on stalks 2-5 mm. long; glumes 4 and 6 mm. long; lemma smooth 7 mm. long, awn 10-13 mm. long; stamen 1. V. I.

7. **F. rubra** L. Culms solitary or few, with rootstocks, 4-9 dm. high; sheaths and blades smooth; panicle contracted in fruit, 5-20 cm. long; spikelets usually glaucous-purplish, 4-6-flowered, 7-8 mm. long; lemma 5-7 mm. long, smooth or scabrous towards the apex, with a rough awn about half its length. Low, sandy or brackish soil, Coast. Variable. Var. **kitaibeliana** (Schultes) Piper. Lemmas pubescent. Alaska to Oregon. Var. **genuina** Hack. Panicles secund, lemma 4-5 mm. long, glabrous, mucronate or with a short awn. V. I. Var. **longisetia** Hack. Panicles thin, the awn twice the length of the lemma. V. I. Var. **megastachys** Gaud. Spikelets 10-12 mm. long, often green, narrow. Mud Bay. Var. **pruinosa** Hack. Panicle dense, spikelets large, leaves and spikelets glaucous, leaves all involute. Mud Bay.

8. **F. occidentalis** Hook. Densely tufted, 5-8 dm. high, no rootstocks; culms slender, shining, basal leaves involute-filiform, green, numerous, soft; panicle loose, but narrow, subsecund, the rays often drooping, 1-1.5 dm. long; spikelets green, 3-5-flowered, 6-10 mm. long; glumes unequal, variable, even on the same plant, sometimes obtuse; lemmas 5-6 mm. long, the awns slightly longer; grain hispid at apex. Open hillsides, V. I. to Kootenay and eastward.

9. **F. ovina** L. Densely tufted, 2-4 dm. high; no rootstocks; basal leaves capillary, firm, very numerous; culm leaves often very short; panicle contracting in fruit, less than 1 dm. long, its spikelets pale, 5-7 mm. long; branches short; lemmas smooth or slightly scabrous, about 3 mm. long; awn 1 mm. long or more, usually shorter than the lemma; grain smooth. V. I.; Coast and eastward; often by roadsides. Var. **sciaphila** A. & G. Lemma hispidulous. Victoria. Var. **supina** Hack. Plants 1-3 dm. high, panicle 2-4 cm. long. Cascades; Alaska. Var. **brachyphylla** (Schultes) Piper. Culms 1 dm. high, blades smooth, soft, becoming longitudinally sulcate in drying. Alaska southward; Roger's Pass; V. I. Var. **ingrata** Hack. Leaves pale or glaucescent scabrous awn often nearly equaling the lemma. Dry interior; Rockies. Var. **duriuscula** (L.) Koch. Leaf-blades 1 mm. broad, (broader than in the species). Rockies and Selkirks.

10. **F. Hallii** (Vasey) Piper. Densely tufted, 3-9 dm. high; the lower sheaths bladeless at flowering, the upper sheaths and often the upper part of the culm rough; leaves mostly involute, pale or glaucous, the lower very long;

panicle rather narrow but loose, often subsecund, 3-15 cm. long, spikelets 8-12 mm. long; lemma densely and finely scaberulous, awnless or with a very short awn about 1 mm. long. Alaska to Colorado; Crow's Nest Pass.

11. *F. elatior* L. (TALL MEADOW FESCUE). Loosely tufted, 5-12 dm. high; blades 4-8 mm. wide, scabrous above; ligule very short; panicle narrow, the branches short, erect, spikelet-bearing nearly to the base; spikelets 1 cm. long; lemma scabrous towards the scarious acute apex, rarely short awned. Introd. Vancouver; Okanagan; Comox.

12. *F. subuliflora* Scrib. Rather slender, 6-9 dm. high; blades 3-6 mm. wide, glabrous beneath; sheaths scabrous, ligule short; panicle 15-20 cm. long, the nodes distant, the branches flexuous, solitary or in pairs, the lower 7-10 cm. long; spikelets purplish or green, 3-4-flowered, the florets stipitate at base; glumes 1-nerved, lemmas 6-8 mm. long, 5-nerved, scabrous, keeled below, awn 10-15 mm. long. Goldstream, V. I.

13. *F. subulata* Trin. Culm scaberulous, 4-9 dm. high; sheaths nearly smooth, blades 3-10 mm. broad, scabrous on both sides; panicle loose, 15-40 cm. long; spikelets pale green or purplish, 3-5-flowered; glumes 1- and 3-nerved, the lower $\frac{2}{3}$ as long as the upper; lemma 3-nerved, keeled for its whole length; awn 5-20 mm. long. Alaska southward; Nanaimo; Agassiz; Chilliwack Valley.

42. LOLIUM (DARNEL)

Tall; leaves flat; the flat spikelets in spikes, each placed edgewise to the rachis, the inner glume wanting, solitary in the notches of the rachis; the glume exceeding the lower floret; lemmas convex, 5-7 nerved, awned or awnless. All the following are introduced.

1. *L. perenne* L. Perennial, 3-6 dm. high, glabrous, tufted, leaves folded in the bud, spike often spirally twisted, spikelets often distinct below; glume shorter than the 5-10-flowered spikelet, lemma 5-6 mm. long, usually awnless. Common.

2. *L. multiflorum* Lam. Similar to the preceding with which it often occurs, leaves convolute in the bud; spikelets 10-20-flowered, lemmas 5-8 mm. long, awned; internodes of inflorescence rough on convex side, while in the preceding the roughness is confined to the angles.

3. *L. temulentum* L. Annual, taller, glume fully equaling the 5-7-flowered spikelets; lemmas awned. A noxious grass, apparently not common; V. I.

43. AGROPYRON (WHEAT GRASS)

Spikelets 3- many-flowered with their sides towards the rachis and arranged in a spike, one at each node; lemma awned or awnless, rounded on the back, usually 5-nerved; palea 2-keeled, the keels often ciliate; stamens 3, styles short; leaves flat or keeled. (Greek *agros*, a field, *pyros*, wheat).

Culms from creeping rootstocks, not strongly tufted.

Spikelets about 5-flowered, glumes nearly as long 1. *A. repens*.

Spikelets 7-13-flowered, glumes $\frac{1}{2}$ - $\frac{2}{3}$ as long 2. *A. occidentale*.

Culms strongly tufted, no rootstocks (Bunch Grass).

Spike nodding at the top, awns of lemma 1.5-2.5 cm. long 3. *A. caninum*.

Spikes stiff, lemma usually awned or awnless.

Spikelets flattened, 8-20 mm. distant, awn 1-2 cm. long 4. *A. spicatum*.

Spikelets sub-terete, 3-10 mm. distant, awn short.

Spikes slender, 5-20 cm. long, lower glume 5-nerved 5. *A. tenerum*.

Spikes short, 2-8 cm. long, lower glume 3-nerved 6. *A. biflorum*.

1. *A. repens* (L.) Beauv. (COUCH GRASS.) Tall, green or glaucous; sheaths glabrous or the lower sparingly pilose; blades flat or involute, scabrous or sparsely pilose above, spikes 0.5-1.5 dm. long; spikelets flattish, 1-1.5 cm. long, glumes awn-pointed, nearly as long as the spikelets; lemmas about 1 cm. long, nerved, glabrous or scabrous, pointed or with an awn reaching 5 mm. in length. Widely diffused in N.A.; apparently not common at the Coast. Semiamoo Bay.

2. **A. occidentale** Scrib. Tall, glaucous; sheaths, culms and blades strongly striate; leaves smooth or slightly scabrous on the back, scabrous on the nerves above, flat or involute; spike 1-1.5 dm. long, spikelets flat, 12-20 mm. long, somewhat spreading; glumes very strongly nerved, $\frac{1}{2}$ - $\frac{2}{3}$ as long as the spikelets, usually with an awn 3 mm. long; lemma not strongly nerved, smooth or granulose, obtuse, mucronate or with an awn 2-3 mm. long. Dry soil, V. I. to Rockies; Castlegar.

3. **A. caninum** (L.) Beauv. Tall, leaves smooth beneath, usually rough above; spikes usually nodding, often 1-sided, 8-20 cm. long; spikelets 4-8 mm. distant, 3-6-flowered; glumes about as long as the spikelet, awn 2-8 mm. long; lemma smooth on the back below, scabrous above, awn slender, twice as long as the lemma. (*A. Richardsonii*). Kamloops; Kootenay.

4. **A. spicatum** (Pursh.) Rydb. Slender, densely tufted, usually glaucous, 3-9 dm. high; leaves narrow, involute, nearly smooth, except on the margins; spikes 6-14 cm. long, spikelets remote, erect or somewhat diverging, 3-6-flowered, glumes smooth, awnless; lemmas smooth on the back below, 5-nerved and rarely scabrous above; awn stout, diverging, 1-2 cm. long. (*A. divergens* Neer.) Lytton to Rockies; also on Texada Island.

5. **A. tenerum** Vasey. Green or glaucous, leaves flat or involute, scabrous; florets 3-7, the lower glume usually 5-nerved; spikes often loose, spikelets appressed, 8-20 mm. long; lemma broadest below the middle, firm in texture, smoothish on the back below, scabrous and 5-nerved at the apex; awn stiff, 0-4 mm. long. D. I., Yale eastward; Coast and V. I.; Alaska.

6. **A. biflorum** (Brign.) R. & S. Usually glaucous; leaves flat or involute, scabrous, florets 2-5, the lower glume usually 3-nerved, lemma broadest above the middle, rather soft in texture; spikes slender, sometimes purplish, spikelets appressed, 8-13 mm. long, lemma smoothish below, scabrous and 5-nerved above, awn weak, 0-4 mm. long. (*A. violaceum* Vasey). This and the two preceding species are the Bunch Grasses of the interior.

44. ELYMUS (WILD RYE)

Tall, stout perennials with spicate inflorescence; spikelets 2-6-flowered in pairs; glumes rigid, narrow, sometimes linear, placed towards the front of the large spikelets; lemmas convex, 5-nerved, obtuse or acute, awned, awn-pointed, or awnless; grain hairy at the apex. (Greek *eluein*, to roll up).

Lemmas glabrous (or nearly so) or merely scabrous.

Awn of lemma short or none

Awn of lemma 8-30 mm. long.

Awn of lemma 8-12 mm. long; spikelets often solitary

Awn of lemma 10-30 mm. long; spikelets in pairs

Lemmas pubescent, at least on the margins

Awns of the long-pubescent lemma 2-5 cm. long

Awns of the ciliate lemma 20-25 mm. long

Awns of lemma less than 5 mm. long.

Lemma grey-tomentose

Lemma pubescent.

Spikelets 2-2.5 cm. long.

Plants glaucous, spike whitish

Plants green, spike green

Spikelets less than 1.7 cm. long

6. *E. condensatus*.

1. *E. Macounii*.

2. *E. glaucus*.

4. *E. canadensis*.

3. *E. borealis*.

5. *E. dasystachys*.

7. *E. arenarius*.

8. *E. vancouverensis*.

9. *E. innovatus*.

1. **E. Macounii** Vasey. Culms 6-9 dm. high; leaves narrow, 4 mm. wide, scabrous; spikes 8-15 cm. long often with one spikelet and 3 glumes at each joint; glumes linear-lanceolate, scabrous, 3-nerved, 6-8 mm. long, with an awn about as long; lemmas punctulate below, scabrous above, 8-10 mm. long. Kamloops. *E. nitidus* Vasey is very similar, but with a shining lemma. Agassiz; Shuswap.

2. **E. glaucus** Buck. Glabrous, usually tufted, 5-10 dm. high; leaves 4-10 mm. wide, scabrous; spikes 1.5 dm. long, 1 cm. thick; glumes lanceolate, 3-5-nerved, smooth or scabrous, about 12 mm. long, without the short awn;

lemmas smooth or scabrous, not ciliate, 10 mm. long; awn from about once to three times as long; spikelets 3-6-flowered. Common, Atlantic to Pacific; Vancouver; Alaska.

3. *E. borealis* Scrib. Rather slender, about 7 dm. high, with soft flat leaves and slender nodding spikes, 7-12 cm. long, sometimes interrupted, culm and sheaths smooth; leaf-blades nearly 1 cm. broad, scabrous on both sides and especially on the margins; spikelets about 1.5 cm. long, 2-5-flowered; glumes lanceolate, 3-nerved, about 8 mm. long, the outer pair ciliate near apex, the inner usually naked; lemma about 1 cm. long, ciliate on margins especially towards the apex, awn 2-2.5 cm. long. Alaska to Wn.; V. I.; Skeena.

4. *E. canadensis* L. Green or glaucous, tufted, 6-15 dm. high, stout; leaves 1-2 cm. broad, scabrous below; spike about 2 dm. long and 1.5 cm. thick, soon nodding, rather loose below; glumes linear, scabrous; lemma hirsute, with very long, somewhat spreading awns. Columbia Valley; Summerland; Thompson River.

5. *E. dasystachys* Trin. Not tufted, 6-9 dm. high, glabrous; leaves 4-8 mm. wide; spike erect, 1 dm. long or less, loose below; spikelets 4-7-flowered, 1.5-2 cm. long; glumes linear, pubescent, not so long as the spikelet, often very short, equal or unequal, short-awned; lemmas densely pubescent, about 1 cm. long, without the short awn. Field, and northward.

6. *E. condensatus* Prisl. Stout, tufted, 6-20 dm. high; leaves 1-2 cm. broad, scabrous above, ligules 4-6 mm. long; spike 2-3 dm. long, broadest in the middle, often loose below; glumes subulate, smooth or scabrous, nearly or quite equaling the spikelets, lemmas pubescent or scabrous, or slightly pubescent at apex, merely awn-pointed or awnless. Thompson River to Rockies; Cranbrook.

7. *E. arenarius* L. var. *villosus* E. Mey. Stout, tufted, 6-15 dm. high; culms velvety-pubescent at summit; leaves 1 cm. wide, smooth. spikes whitish, dense, except at base, 1-2.5 dm. long, 1.5-2 cm. broad; spikelets 2-2.5 cm. long, 5-8 mm. broad; glumes acute, broadly lanceolate, villous, awnless, $\frac{1}{3}$ as long as the spikelets; lemmas pubescent, awn-pointed or awnless; lemmas and glumes scarious-margined. Sea shore, Vancouver, northward to Alaska.

8. *E. vancouverensis* Vasey. Stout, not tufted, about 6 dm. high; leaves 4-8 mm. broad, smooth or slightly scabrous above; spike greenish, 1-2 dm. long, tapering to the apex, 1.2 cm. broad; spikelets 4-5 mm. broad; glumes acuminate, short-awned, lanceolate, villous or sparingly so towards the apex, $\frac{1}{2}$ to $\frac{2}{3}$ as long as the spikelet; lemmas and glumes barely or not at all scarious-margined, awn short or none; lemmas pubescent towards the margins and apex, short-awned or awnless. Alaska to Washington, west of Cascades; Victoria; Ladysmith; Crescent, near the shore.

9. *E. innovatus* Beal. Rather slender, 5-8 dm. high, often pubescent below the nodes; leaves flat or involute, 2-4 mm. wide; spike erect, short exserted, 7-12 cm. long; spikelets 2-6-flowered; glumes setaceous, pubescent, awn-pointed, 4-12 mm. long, subequal; lemmas oval-lanceolate, 7-9 mm. long, villous-pubescent, awn 0-4 mm. long. (This description probably includes *E. villosiflorus* Rydb.) Northeastern B.C. to Wn.

45. SECALE (Rye)

Secale cereale L. (Cultivated Rye). A stout, tall, glaucous annual; the sessile, solitary, usually 2-flowered spikelets in a thick, dense spike; glumes narrowly lanceolate, 1-nerved; lemmas long-awned, without a callus at base, scabrous on the keel, persistent after the grain has fallen. Distinguished from *Agropyron* by the last two characters; from *Triticum* by the narrow, 1-veined glumes; and from *Elymus* by the spikelets solitary at each joint of the rachis. Occasionally spontaneous.

46. TRITICUM (WHEAT)

Triticum vulgare L. Annual or biennial; spikelets glabrous or pubescent, in 2 rows in a spike, 1 at each joint, short and broad, 2-5-flowered; glumes broad, several-nerved, awned or awnless; lemmas persistent after the grain has fallen, toothed or awned, the awns often long. (*L. tritum*, ground [into flour]).

47. HORDUM (BARLEY)

Inflorescence a spike; the spikelets 3 at each joint of the rachis, each 1-flowered, usually only the middle one fertile, the lateral pair usually pediceled, often reduced to awns (in cultivated barley, *H. hexastichon* L. all 3 fertile); the rachilla prolonged behind the palea of the central floret as an awn, sometimes with a rudimentary floret; glumes bristle-like, often simulated by the sterile florets; lemma awned; palea slightly shorter; grain hairy at tip. (Latin name for Barley).

Floret of the central spikelet peduncled; central glumes ciliate; spike bushy	1. <i>H. murinum</i> .
Floret of central spikelet sessile; glumes not ciliate.	
Glumes all alike, bristle-like.	
Spikes broad, bushy; glumes 2-6 cm. long, awn of lateral florets more than half the body of lemma.	
Awns 4-6 cm. long	2. <i>H. jubatum</i> .
Awns 2-3 cm. long	3. <i>H. cæspitosum</i> .
Spikes narrow, glumes 1-2 cm. long, awn of lateral florets not more than one-half the body of lemma.	
Lateral spikelets neutral	4. <i>H. nodosum</i> .
Lateral spikelets perfect	5. <i>H. boreale</i> .
Some of the glumes lanceolate.	
Leaves rough above, spike 4-6 times as long as broad	6. <i>H. pusillum</i> .
Leaves smooth, spike 2-3 times as long as broad	7. <i>H. geniculatum</i> .

1. ***H. murinum*** L. (WALL B.) Culm glabrous, rather stout, 3-5 dm. high, tufted, green or somewhat glaucous; leaves rather broad, rough, often hairy, sheaths smooth; lateral spikelets neutral, their often ciliate glumes awn-like, awn of floret 2-3 cm. long, ciliate, central flower perfect, its glumes broader, ciliate, the awn of its lemma 18-35 mm. long, the spike rather bushy, often partly enclosed in the smooth sheath. Nanaimo; Victoria; Vancouver.

2. ***H. jubatum*** L. (SQUIRREL TAIL). Ascending, 3-6 dm. high; leaves rough, spike nodding, 5-12 cm. long, usually exserted, almost as broad as long; peduncle sometimes sinuous beneath the spike, lateral spikelets neutral, the florets often reduced to awns; glumes of the central perfect spikelet awn-like, 3-6 cm. long, the awn of the lemma about as long; all awns very slender. Very common east of the Cascades; Coast.

3. ***H. cæspitosum*** Scribn. Erect, tufted, culms and sheaths smooth, leaves rough, 3-5 mm. broad, glumes about 20 mm. long, central floret nearly sessile, its awn 12 mm. long, lateral florets rudimentary. Type locality, Dakota. Coast plants assigned to this species are much like short-awned specimens of *H. jubatum*, but with culms and spikes erect and with the awn of the central floret about as long as the glumes and often smooth leaves. Vancouver; Crescent.

4. ***H. nodosum*** L. Glabrous; culms 3-7 dm. high; leaves 5-8 mm. wide, rough; spike narrow, 2-8 cm. long, often nodding towards apex, lateral spikelets neutral, awnless or short-awned; all the glumes awn-like, 1-1.5 cm. long, hardly equaling the awn of the perfect flower. California to Alaska. Moist or saline soil in the interior; common near the Coast.

5. ***H. boreale*** Scrib. & Smith. Culms slender, erect; leaves rough; glumes all awn-like; lemma of central spikelet lanceolate, bearing an awn 10 mm. long. California to Alaska; Renfrew district, V. I.

6. *H. pusillum* Nutt. Annual, 1-4 dm. high; leaves short, erect, rough; lateral spikelets neutral, one of their glumes lanceolate; both glumes of the central spikelet lanceolate, all with awns 8-15 mm. long, equaling the awn of the lemma. Victoria, eastward; (introd.)

7. *H. geniculatum* All. Smooth annual, the upper sheath inflated and the spike hardly exserted, 2-5 cm. long; the inner glume of the lateral spikelets narrowly lanceolate, wider than the outer; glumes of the central spikelet lanceolate. (*H. maritimum* With.) Introd., Coast.

CYPERACEÆ (SEDGE FAMILY)

Grass-like perennials; culms mostly 3-angled and solid, the sheaths closed (not split); flowers in spikes, one in the axil of each chaffy bract; perianth none or represented by bristles or scales; stamens and styles 2 or 3, anthers basifixed; ovary 1-celled, in fruit an achene.

Flowers monœcious.

Achene in the axil of a spathe-like glume	1. Kobresia.
Achene enclosed in a sac.	2. Carex.

Flowers perfect.

Spikelets flattened, the scales in 2 rows.

Perianth bristles none	3. Cyperus.
Perianth bristles 6-9	4. Dulichium.

Spikelets terete, the scales spiral.

Style not enlarged at the base.

Perianth-bristles prominent, long and silky	5. Eriophorum.
Perianth bristles short, barbed	6. Scirpus.

Style enlarged or bulbous at the base.

Spikelets solitary terminating a scape	7. Eleocharis.
Spikelets many in a head; stem leafy	8. Rynchospora.

1. KOBRESIA

Plants with the general aspect of the Vigneæ, section I. of *Carex*; stem triangular, leafy; spikelets in a terminal head; differing in having the pistil enclosed in a spathe-like glume with open edges; spikelets unisexual and 1-flowered or 2-flowered, one pistillate the other staminate; styles and stamens 3. (Kobres was a German naturalist).

1. *K. Bellardi* All. Tufted, 1-3 dm. high; culms slender, leaves narrow, mainly basal; scales of the spikelets 3 or 4, usually only 1 of them flower-bearing; scales with both stamens and pistil; the spikelets in a single spike. (*K. scirpina* Willd.) Rockies and Arctics.

2. *K. bipartita* (All.) Brit. Culms slender, leafy below, solitary or tufted; leaves narrow; the lowest scale of the spikelets pistillate, the next staminate scales somewhat serrulate on the keel; spike 2-3 cm. long, of several appressed or ascending spikelets. (*K. caricina* Willd.) Rockies and Arctics.

CAREX (SEDGE FAMILY)

Perennial, grass-like herbs with mostly trigonous stems (culms) and monœcious, or rarely diœcious, flowers; the staminate flowers of 3 stamens, in the same spike with the pistillate or in distinct terminal spikes; flowers without perianth, the pistillate consisting of a single pistil with a bifid or trifid style forming an achene enclosed in a sac (the *perigynium*) through the orifice of which the style protrudes; both kinds of flowers borne in the axil of a bract (the *scale* in the following description); the spike or spikes of the inflorescence often subtended by bracts. The mature perigynia are necessary for the determination of the species (Greek *karein*, to cut, on account of the sharp leaves). Falling into 2 sections.

Sec. I.—VIGNEÆ

Spikes sessile and similar, bearing the staminate flowers at their base or apex; stigmas 2, achenes lenticular.

Spike solitary, (staminate flowers at the top or in No. 1 spikes diœcious).

Perigynia strongly nerved on the outer face 1. *C. gynocrates*.

Perigynia nerveless or nearly so.

Beak of perigynium $\frac{1}{4}$ as long as the body 2. *C. capitata*.

Perigynia beakless or nearly so 3. *C. nardina*.

Spikes 2—many.

Stamens borne at the base of the spikes.

PERIGYNIA WINGED, AT LEAST ABOVE.

Inflorescence dense, the individual spikes not clearly defined.

Bracts much longer than the heads.

Perigynia lance-subulate, 5 mm. long 4. *C. sychnocephala*.

Perigynia lance-ovate, 2-3 mm. long 6. *Cathrostachya*.

Bracts wanting or not much, if at all, longer than the heads 5. *C. festiva*.

Inflorescence more open, or open below, (the individual spikes clearly defined).

Plants very strongly stoloniferous, the staminate flowers mixed with pistillate 43. *C. siccata*.

Plants solitary or tufted, not strongly stoloniferous, stamens basal.

Tips of perigynia reflexed concealing the scales 7. *C. cristata*.

Tips of perigynia erect or ascending.

Perigynia 8-12 mm. long 9. *C. Liddonii*.

Perigynia less than 6.5 mm. long.

Perigynia erect or ascending.

Perigynia distinctly exceeding the scales.

Inflorescence open.

Perigynia about 10-nerved on the inner face, 4-6 mm. long 11. *C. hormathodes*.

Perigynia 3-5-nerved on the inner face, or nerveless, mostly less than 4 mm. long 12. *C. straminea*.

Inflorescence rather close.

Perigynia 1 mm. wide 14. *C. Crawfordii*.

Perigynia wider.

Perigynia suborbicular 13. *C. festucea* var.

Perigynia lance-ovate 5. *C. festiva* var.

Perigynia equaled by the scales or shorter.

Inflorescence flexuous at maturity inclined to nod at apex, or at least with the lower spikes slightly remote.

Spikes greenish or silvery-brown.

Inner face of perigynia nerved 17. *C. fœnea*.

Inner face of perigynia nerveless or nearly so 15. *C. pratensis*.

Spikes brown.

Perigynia $\frac{1}{3}$ as broad as long, achene 1 mm. broad 15. *C. pratensis* var.

Perigynia $\frac{1}{2}$ as broad as long, achene 1.3-1.7 mm. broad 16. *C. ænea*.

Inflorescence stiff and erect, or at least with approximate spikes.

Spikes greenish or silvery-brown 18. *C. fœnea*.

Spikes brown or ferruginous.

Spikes not subglobose, perigynia about 2 mm. broad, the beaks not bidentate.

Spikes dark brown, perigynia long-beaked, narrowly winged 8. *C. phæocephala*.

Spikes chestnut, perigynia not long-beaked, rather broadly winged 10. *C. petasata*.

Spikes subglobose, perigynia 2-3 mm. broad, the beaks bidentate 17. *C. adusta*.

Perigynia spreading or divergent 5. *C. festiva*.

Inflorescence dark brown

Inflorescence greenish or yellowish.

Beak of perigynium nearly equaling the body, scales acute 19. *C. Leersii*.

Beak of perigynium shorter; scales blunt 20. *C. scirpoides*.

PERIGYNIA NOT THIN MARGINED NOR WINGED.

Inflorescence subtended by a bract 5-8 cm. long.

Perigynia strongly nerved, short-beaked 24a. *C. canescens* var.

Perigynia faintly nerved, long-beaked 26. *C. Deweyana*.

- Inflorescence naked or setaceous-bracted.
 Inflorescence dense, ovate; plants resembling *C. festiva*.
 Inflorescence less than 15 mm. long, greenish brown.
 Perigynia about equaling the acute, hyaline-margined scales 21. *C. tenuirostris*.
 Perigynia larger than the obtuse, or blunt dark-brown scales 22. *C. illota*.
 Inflorescence about 25 mm. long 23. *C. arcta*.
 Inflorescence open below, or individual spikes distinctly recognizable.
 Perigynia 3-4.5 mm. long or more 26. *C. Deweyana*.
 Perigynia less than 3 mm. long.
 Spikes short-cylindrical 24. *C. canescens*.
 Spikes subglobose, ovoid or obovoid.
 Perigynia tapering gradually into a short beak.
 Spikes silvery or greenish 24. *C. canescens*.
 Spikes brownish.
 Culms very rough, stiff, erect, leaves involute. 28. *C. helconastes*.
 Culms smoothish, weak, leaves flat 27. *C. laviculmis*.
 Perigynia abruptly contracting into a distinct beak.
 Culms slender, not alpine 25. *C. brunnescens*.
 Culms stiff, alpine 29. *C. Lachenalii*.
- Staminate flowers at the top of the spikes or throughout.**
 Inflorescence a dense head
 Perigynia 12-15 mm. long 30. *C. macrocephala*.
 Perigynia 3-6 mm. long.
 Heads pale or yellowish.
 Tall, inflorescence elongated, leaves broad 31. *C. stipata*.
 Low, inflorescence ovoid, leaves narrow 34. *C. Douglasii*.
 Heads brown.
 Perigynia roundish, shorter than the scale 36. *C. Gayana*.
 Perigynia lanceolate or ovate equaling the scale or longer.
 Perigynia strongly nerved on both sides 32. *C. densa*.
 Perigynia not strongly nerved on both sides.
 Perigynia bidentate, rough on edges, equaling the scale 33. *C. Hoodii*.
 Perigynia obliquely cut at apex, exceeding the scale. 35. *C. incurva*.
 Inflorescence spicate, elongated, dense or interrupted.
 Plants very slender, inflorescence interrupted, spikelets 3-6 mm. long.
 Spikelets pale or greenish 37. *C. tenella*.
 Spikelets chestnut 38. *C. Hookeriana*.
 Plants not very slender; inflorescence not or hardly interrupted, spikelets about 1 cm. long or more.
 Perigynia 3-5 mm. long.
 Leaves usually 5-10 mm. broad, perigynia tapering from spongy base 31. *C. stipata*.
 Leaves narrower, perigynia not tapering from a spongy base.
 Perigynia strongly nerved, with long beaks; spikes 10-25. 39. *C. Sartwellii*.
 Perigynia faintly nerved with short beaks; spikes several 41. *C. camporum*.
 Perigynia less than 3 mm. long.
 Perigynia teretish, plump. 40. *C. diandra*.
 Perigynia flat 42. *C. alma*.
- Some of the spikes entirely staminate, or the plant dioecious with rootstocks.**
 Perigynia 12-15 mm. long 30. *C. macrocephala*.
 Perigynia 6 mm. long or less.
 Inflorescence elongated.
 Perigynia winged, the beak as long as the body 43. *C. siccata*.
 Perigynia hardly winged, the beak shorter than the body 39. *C. Sartwellii*.
 Inflorescence an ovoid head 15-25 mm. long.
 Scales awned or acute, pale 34. *C. Douglasii*.
 Scales not awned, brown 36. *C. Gayana*.

Sec. II.—EUCAREX

Stigmas 3; some of the spikes strictly pistillate, with one or more terminal staminate spikes; if stigmas 2, some of the spikes peduncled; or stigmas 2 or 3, spikes somewhat similar, more or less staminate at base, more or less peduncled.

Stigmas 2, sometimes 2 or 3 in a single plant, achenes lenticular.

Terminal spike staminate.

Some or all of the pistillate spikes drooping.

Pistillate spikes 6-14 mm. long.

Leaves seldom more than 8 cm. long 99. *C. misandra*.

Leaves long 53. *C. invisa*.

Pistillate spikes longer.

Peduncles very short, spikes close, 8-10 mm. thick 44. *C. sitchensis*.

Lower peduncles 5-15 cm. long, spikes more slender, the upper often erect.

Scales with a white stripe down the middle 45. *C. Barbaræ*.

Scales brown 46. *C. Howellii*.

All the peduncles about the same length, 2-6 cm. long, all pistillate spikes drooping 47. *C. cryptocarpa*.

Pistillate spikes erect.

Perigynia lustrous or somewhat inflated, or both; 4-5 mm. long.

Spikes nearly 12 mm. thick, bracts long 107. *C. salina*.

Spikes 6-10 mm. thick, bracts short or not exceeding the culm.

Peduncles of the upper pistillate spike about 3 cm. long 108. *C. physocarpa*.

Peduncles of the upper pistillate spike wanting or short.

Perigynia purple 109. *C. saxatilis*.

Perigynia yellow 110. *C. Grahami*.

Perigynia dull, plump but not inflated, 2-3 mm. long.

Perigynia yellowish, obpyriform 48. *C. aurea*.

Perigynia whitish, ellipsoidal 49. *C. bicolor*.

Perigynia compressed.

Perigynia nerveless or nearly so, mostly granulate.

Spikes 6-10 mm. thick.

Spikes 2.5 cm. long or less, plants not very stout.

Scales obtuse, staminate spike sessile 50. *C. Tolmiei*.

Scales acute, staminate spike peduncled 51. *C. rigida*.

Spikes longer, plants stout.

Leaves dark green, channeled; perigynia not thin 44. *C. sitchensis*

Leaves glaucous, flat; perigynia thin v. nos. 56, 57.

Spikes 2-6 mm. thick.

Spikes 0.5-2.5 cm. long.

Scales obtuse, pistillate spikes 2-3 mm. thick 52. *C. nudata*.

Scales acute, pistillate spikes 4-6 mm. thick 53. *C. invisa*.

Lower spikes very long-peduncled

Lower spikes not very long-peduncled

Scales lanceolate, with acuminate spreading tips 54. *C. aperta*.

Scales ovate-elliptical, acutish 51. *C. rigida*.

Spikes longer.

Bracts equaling the culm or shorter, perigynia

nearly nerveless, not thin

Scales ovate-elliptical, very dark, acutish 51. *C. rigida* var.

Scales narrower, not very dark, obtuse or

muticous 55. *C. acutina*.

Bracts exceeding the culm, perigynia nerve-

less, thin

Culms obtusely angled; the scales equaling

or shorter than the perigynia 56. *C. aquatilis*.

Culms acutely angled; the slightly narrower

scales often slightly exceeding the

perigynia 57. *C. variabilis*.

Perigynia nerved.

Scales acute, lower bract not exceeding the inflorescence 58. *C. nebraskensis*.

Scales mostly obtuse, lower bract exceeding the

inflorescence

Green midrib of the oblong or narrowly obovate

scale broad; perigynia short-beaked, stipitate 59. *C. decidua*.

Green midrib of the ovate scale slender; perigynia

hardly beaked, not stipitate 60. *C. Goodenovii*.

Terminal spike staminate only at base.

- Spikes sessile or nearly so, dark 92. *C. Halleri*.
 Spikes peduncled, drooping 61. *C. Mertensii*.
 Spikes peduncled, erect, pale brown or whitish. 48. *C. aurea*.
 Perigynia yellowish, obpyriform 49. *C. bicolor*.
 Perigynia whitish, ellipsoidal

Stigmas 3, achenes 3-angled.

SPIKE SOLITARY.

Perigynia hairy or scabrous.

Plants dioecious, leaves 2-3 mm. wide, perigynia pubescent throughout.

- Fertile spikes about 3 mm. thick, perigynia about 2 mm. long 64. *C. scirpiformis*.

Fertile spikes 5-7 mm. thick, perigynia 3-4 mm. long.

- Scales broadly hyaline margined, perigynia yellowish-hirsute 62. *C. scirpoidea*.

Scales very narrowly hyaline margined, perigynia whitish-pubescent 63. *C. stenochlæna*.

Plants monœcious, leaves filiform, perigynia scabrous or slightly hairy above 65. *C. filifolia*.

Perigynia glabrous.

Scales 2-4 times as long as the perigynium or foliaceous.

- Staminate flowers conspicuous, bracts not foliaceous 66. *C. Geyeri*.

Staminate flowers inconspicuous, bracts foliaceous 67. *C. Backii*.

Scales shorter or a little longer than the perigynia.

Perigynia reflexed at maturity, lanceolate.

Perigynia yellowish, few, much exceeding the scales.

- Orifice of the perigynium closed by a racheola from within 69. *C. microglochin*.
 Orifice of perigynium not so closed 68. *C. pauciflora*.

Perigynia dark, many, slightly if at all exceeding the scales.

- Stoloniferous, leaves flat, perigynium ovate, the beak 2-toothed 70. *C. nigricans*.

Tufted, leaves narrow, involute, perigynium linear-oblong, the beak obliquely cut 71. *C. pyrenaica*.

Perigynia erect or spreading, ovate.

Perigynia greenish.

- Perigynia many nerved, blunt 72. *C. leptalea*.

Perigynia 1 nerved on each face, beaked 66. *C. Geyeri*.

Perigynia brown or purple.

- Perigynia shorter than the obtuse scales 73. *C. rupestris*.

Perigynia longer than the acute scales 74. *C. obtusata*.

PISTILLATE SPIKES 2-SEVERAL.

Perigynia pubescent.

Pistillate spikes 1.5-5 cm. long, cylindrical.

- Perigynia hairy only on the angles 75. *C. ablata*.

Perigynia uniformly hairy.

- Beak entire, spikes peduncled 83. *C. Richardsonii*.

Beak strongly bidentate, spikes mostly sessile.

- Leaves involute filiform 76. *C. lasiocarpa*.

Leaves flat, 2-5 mm. broad. 77. *C. lanuginosa*.

Pistillate spikes less than 1.2 cm. long.

Lower pistillate spikes on subradical peduncles.

Bracts of the lowest non-basal pistillate spikes leaf-like.

- The lower bract shorter than the culm, auriculate and strongly reddish at base 78. *C. brevicaulis*.

The lower bract exceeding the culm, hardly colored at base.

- Perigynia 2½ mm. long, the beak 0.5 mm. long 79. *C. deflexa*.

Perigynia 3-4.5 mm. long, the beak 0.8-1.3 mm. long 80. *C. C. Rossii*.

Bracts of the lowest non-basal pistillate spikes scale-like 82. *C. abdita*.

Subradical spikes absent.

Pistillate spikes subtended by tubular, colored sheaths without green blades.

- Staminate spike 3-7 mm. long; scales obtuse, short 84. *C. concinna*.

Staminate spike 8-22 mm. long, scales acute, about equaling or longer than the perigynia.

- Perigynia loosely-pubescent, wider and longer than the scales, pistillate spikes few-flowered 85. *C. concinnoides*.

Perigynia appressed-pubescent, narrower and shorter than the scales, pistillate spikes many-flowered 83. *C. Richardsonii*.

Pistillate spikes naked or with foliaceous bracts, but without colored sheaths.

Staminate spike less than 1.5 cm. long.

- Spikes approximate, scales shorter than the perigynia 81. *C. albicans*.

Spikes distinct, scales equaling the perigynia 86. *C. communis*.

- Staminate spike 2.5 cm. long 87. *C. vespertina*.

Perigynia glabrous.

Perigynia entire, emarginate or with soft teeth.

Terminal spike not entirely staminate, spikes often more or less staminate at base.

Pistillate spikes drooping when mature.

Perigynia narrowly lanceolate 99. *C. misandra*.

Perigynia ovate, elliptical or orbicular.

Perigynia not thin nor winged.

Perigynia much shorter than the scale 101. *C. paupercula*.Perigynia equaling or longer than the scale 91. *C. atrata*.Perigynia very thin, winged 61. *C. Mertensii*.

Pistillate spikes erect, sessile or peduncled.

Scales yellowish or greenish, perigynia strongly many-nerved.

Beak of perigynia equaling the body 88. *C. flava*.Beak of perigynia half the body 89. *C. Æderi*.

Scales darker, perigynia often granulate, not strongly many-nerved.

Spikes aggregated in a head or only the lowest distant sessile or short-peduncled.

Scales shorter than or about equaling the perigynia.

Scales rough awned, perigynia stipitate. 90. *C. Gmelini*.

Scales not rough awned, perigynia not or hardly stipitate.

Spikes less than 1 cm. long 92. *C. Halleri*.Spikes more than 1 cm. long 91. *C. atrata*.Scales longer than the perigynia 93. *C. polygama*.

Spikes peduncled, not aggregated.

Beak of the perigynia short, 2-toothed 91. *C. atrata*.

Beak none, the orifice entire.

Perigynia obovoid, style deciduous. 94. *C. Parryana*.Perigynia ovoid, style persistent 95. *C. stylosa*.

Terminal spike entirely staminate.

Pistillate spikes loosely flowered, erect, plants, including spikes, pale green.

Slender; perigynia distinctly beaked, bidentate 96. *C. vaginata*.Stout; perigynia very short-beaked, entire 97. *C. Hendersoni*.

Pistillate spikes densely flowered or loose only at the base.

Pistillate spikes all, or mostly all, peduncled, often drooping.

Staminate spike small, sessile, pistillate spikes erect 98. *C. eburnea*.

Staminate spike peduncled, pistillate spikes mostly nodding or drooping.

Perigynia with a distinct beak, the upper pistillate spike mostly erect.

Scales pale; plants tufted, slender 100. *C. capillaris*.

Scales dark; plants not tufted.

Leaves rarely over 8 cm. long, perigynia lanceolate 99. *C. misandra*Leaves long, perigynia elliptical 53. *C. invisa*.

Perigynia almost beakless, pistillate spikes all drooping.

Plants not tufted, bracts filiform 102. *C. limosa*.Plants tufted, bracts not filiform 101. *C. paupercula*.

Pistillate spikes sessile or only the lower peduncled, erect.

Scales of pistillate spikes not awned, leaves 8 mm. broad, or less.

Perigynia beakless or very short beaked; the lower bract usually not exceeding the culm.

Perigynia granulate or papillose, faintly nerved or nerveless, hardly 2 mm. long.

Perigynia ovate, style persistent 95. *C. stylosa*.Perigynia obovate, style deciduous 94. *C. Parryana*.

Perigynia not granulate nor papillose, nerved (or nerveless or nearly so in No. 49) 3-4 mm. long.

Pistillate spikes 6-8 mm. thick.

Leaves green, smooth, 4-7 mm. wide, the apex long tapering 49. *C. Tolmiei*.

Leaves otherwise.

Perigynia oval, scales obtuse 103. *C. heteroneura*.Perigynia obovoid, scales acute 104. *C. Reynoldsii*.Pistillate spikes 4-5 mm. thick, plants light green 105. *C. livida*.

- Perigynia distinctly beaked, with a beak at least half as long as the body of the perigynia; bracts exceeding the culm.
- Beak of perigynia about as long as the body, slightly oblique 88. *C. flava*.
- Beak of perigynia half as long as the body, straight 89. *C. Ederl*.
- Scales of pistillate spikes awned, leaves 10-15 mm. broad 106. *C. amplifolia*.
- Perigynia bidentate with rigid teeth; generally rather large, 4-10 mm. long.
- Perigynia finally retrorse.
- Perigynia not inflated, scales rough-awned; spikes drooping 111. *C. comosa*.
- Perigynia inflated, scales smooth; spikes erect 112. *C. retrorsa*.
- Perigynia ascending or spreading.
- Pistillate spikes drooping 113. *C. hystericina*.
- Pistillate spikes erect.
- Perigynia tapering from near the base, to a stout beak, hardly inflated. 114. *C. exsiccata*.
- Perigynia contracting above to a slender beak, more or less inflated below.
- Culms stout, spongy at base, generally smooth and bluntly angled above.
- Perigynia abruptly contracting into the beak 115. *C. rostrata*.
- Perigynia tapering into the beak 115a. *C. rostrata* var. *utriculata*.
- Culms more slender, hardly spongy at base, sharply angled, generally rough above.
- Perigynia abruptly contracting into the beak 116a. *C. vesicaria* var. *monile*.
- Perigynia tapering into the beak 116. *C. vesicaria*.

1. ***C. gynocrates*** Wormsk. Culms slender, 0.5-3 dm. high, mostly exceeding the narrow setaceous leaves; spikes 0.5-2 cm. long, some staminate, others staminate above, or some pistillate; perigynia 6-12, plump, narrowly margined or thin edged, beaked, nearly 4 mm. long, spreading at maturity, about equaling the pale brown scale. Swamps; Rockies and Selkirks; Alaska.

2. ***C. capitata*** L. Culms slender, stiff, 0.7-5 dm. high; leaves filiform, usually shorter than the culm; spikes ovoid, 0.5-1 cm. long, brown; perigynium ovate, whitish, or light brown, with short nearly entire beak, 2-3 mm. long, longer than the thin brown obtuse scale. Rockies.

3. ***C. nardina*** Fier. Culms 0.5-2 dm. high; leaves filiform, about as long as the culms or longer; perigynia yellowish-brown, nerveless, long-elliptical, 3-4 mm. long, hispid above, scales brown, obtuse or acute, rather longer than the perigynia. Summits, Rockies; Alaska.

4. ***C. sychnocephala*** Carey. Culms smooth, 2-6 dm. high; bracts leaf-like, the lowest 1-2 dm. long; leaves 2-4 mm. wide, spikes 4-10 in a very dense ovoid head; perigynia 5 mm. long, 1 mm. wide, nearly nerveless. Kamloops to Sask. and eastw.

5. ***C. festiva*** Dewey. Tufted; 1.5-5 dm. high; the sharply angled culms, rough above, equaling or usually longer than the leaves; leaves 3-4 mm. wide; head ovoid, dark brown, 1.5-2.5 cm. long of 4-8 dense, or clearly distinguishable, spikes, the lower spike sometimes remote or distinct; bracts not more than twice as long as the head or none; perigynia brownish-green, spreading, ovate to narrowly elliptical, lightly nerved on the outer face, winged, rough-margined above, tapering to an obliquely cut beak slit on the inner side; scales usually acute, brown, ovate, usually shorter than the perigynia. Wet meadows, Alaska to California. Var. ***pachystachya*** Bailey. Culms 3-9 dm. high; flat, longer than the leaves; scales ovate-lanceolate to suborbicular, pointless. Range of species. Var. ***ebenea*** (Rydb.) Perigynium lanceolate dark brown, shining. (Var. ***Haydeneana*** Bailey) Rockies. Var. ***gracilis*** Olney. Culms nodding at top, the roundish spikes contiguous or approximate. Victoria; Nanaimo; Selkirks.

6. *C. athrostachya* Olney. Similar; culms triangular, nearly or quite smooth; leaves 2-3 mm. wide, bracts with broad scarious-margined bases, many times longer than the very dense, light brown heads; scales pale brown, lanceolate acute, about equaling the toothed ovate-lanceolate, nearly nerveless perigynia. V. I. to Alberta; grassy thickets and meadows, Victoria.

7. *C. cristata* Schwein. Culms 6-9 dm. high; rough above; leaves 3-7 mm. broad, often exceeding the culms; inflorescence usually dense, or the lower spike distant; spikes 6-15 globose, greenish or brown, 0.5-1 cm. broad; perigynia 3-4 mm. long, their tips spreading or recurved. Mass. to Sask., and B.C.

8. *C. phæocephala* Piper. Tufted, 3-7 dm. high, culms smooth except at apex exceeding the leaves; inflorescence usually bractless, dense, ovoid-oblong, but the individual spikes easily distinguished; spikes ovoid-ellipsoidal, brown, 8-10 mm. long, not clavate at base; perigynia more or less winged, lanceolate, green or brown, 4-5 mm. long, scarcely 2 mm. wide, nerved on the outer, nerveless on the inner, face, the beak $\frac{2}{3}$ as long as the body, hardly bidentate, achene 1.3 mm. broad. (*C. leporina americana*). Said to be near *C. Preslii* Steud. Nootka, V. I., and alpine.

9. *C. Liddonii* Boott. Tufted, 1-4 dm. high; culm rough above, exceeding the leaves; spikes fulvous contiguous in an avoid-oblong head 2-3 cm. long; lanceolate, few nerved, narrowly winged, very gradually beaked, about the length of the acute scale. Cedar Hill, Victoria; Rockies, Montana.

10. *C. petasata* Dewey. Tufted, 1-3 dm. high, culm slender, mostly longer than the leaves which are 1-2 mm. broad; spikes rather narrowly ovoid, approximate above; often looser below, chestnut-brown; perigynia 4-5 mm. long, narrowly ellipsoidal rather than lanceolate, winged, concave on the inner nearly nerveless face, nerved on the outer face, tapering (not contracted) to the entire beak which is slit on the convex face, shorter than the scarious-margined ovate acute scales. Mt. summits; Cascades, Rockies. The plant thus described is apparently a form of *C. Liddonii* with smaller perigynia.

11. *C. hormathodes* Fernald. Culms slender, flexuous, angled, 3-9 dm. high; leaves 1-2.5 mm. wide; strongly ascending; inflorescence slender, moniliform (or in the late culms congested) of 3-9 broadly ovoid, brownish heads, 8-12 mm. long; perigynia long-ovate, distinctly 10-nerved on each face. (*C. straminea* var. *aperta* Boott.) Que. to B.C.

12. *C. straminea* Willd. Very slender, 3-7 dm. high, leaves 0.5-2 mm. wide, spikes distant, ovoid, 4-8 mm. long, yellow-brown, or greenish, on a sinuous or often zig-zag axis; perigynia lance-ovate, gradually tapering to a short beak, inner face 3-5-nerved or nerveless. (*C. tenera* Olney). Growing in clumps in damp meadows. N.B. to B.C.; Agassiz, Shuswap. Var. *mixta* (Bailey). Culms stiff, erect, heads green, V. I.

13. *C. festuceacea* Schk. var. *brevior* (Dew.) Fernald. Culms stiff, 3-6 dm. high; leaves stiff, shorter, 2-4 mm. wide, the sheath with a thin, nearly nerveless, pale band extending down from the membranous auricle; spikes 3-6, approximate, subglobose, yellow-brown, 7-12 mm. long; perigynia suborbicular, strongly nerved on the outer, faintly so on the inner face. Reaching, B.C., eastw.

14. *C. Crawfordii* Fernald. Tufted, slender, 1-4 dm. high, leaves 1-3 mm. wide, equaling or exceeding the culms; spikes approximate, dull brown, 3-12 obovoid or sub-cylindrical, rounded at apex, 3-7 mm. long, perigynia linear-lanceolate, 1-1.3 mm. wide, plump at base. Meadows B.C. to Nfld.; New Westminster; Kootenay.

15. *C. pratensis* Dryer. Tufted, culms smooth, slender, somewhat nodding in the inflorescence, 3-6 dm. high, longer than the leaves, (2-3.5 mm. broad) lower bract setaceous, short; inflorescence flexuous, the lower spikes slightly remote, 3-7, pointed, 0.5-1.8 cm. long, usually clavate at base; scales

hyaline-margined; perigynia thin, ovate-lanceolate, 4.5-6 mm. long, $\frac{1}{3}$ as broad, bidentate, green, the beak nearly as long as the body; achene 1 mm. broad. Prairie, open woods and banks, V. I. to Rockies. Var. *furva* Bailey. Spikes larger, 12 mm. long or more, more loosely flowered, dark brown; culms more sharply angled. Damp meadows; Cedar Hill; Goldstream, V. I.

16. *C. ænea* Fernald. Culms smooth and wiry, more or less flexuous at the tip, 2.5-12 dm. high; leaves much shorter, 2-4 mm. wide; inflorescence much as in *C. pratensis*; spikes clavate based, dark brown, 0.8-2 cm. long, obovoid; perigynia 4-5 mm. long, narrowly winged, $\frac{1}{2}$ as wide, green or brown, slightly bidentate; achene 1.5 mm. broad. Open woods and banks, V. I. and eastward. Departure Bay.

17. *C. adusta* Boott. Culms stiff, smooth; leaves 2.5 mm. broad, shorter; inflorescence stiff, erect; spikes dense, ovoid or short-cylindrical, not clavate, 6-12 mm. long, the lowest often with a stiff bract nearly equaling the head; perigynia winged, 4-5 mm. long, 2-3 mm. broad; achene 1.8-2 mm. broad. Grassy slopes, Beaver Creek, Selkirks.

18. *C. foenea* Willd. Culms slender, smooth, except at tip, 3-6 dm. high, leaves soft, pale green or glaucous, 2-4 mm. broad; spikes 4-9 ovoid blunt, appressed 6-10 mm. long, approximate above, distant less than their own length below, whitish-green or silver-brown; bracts wanting or small; perigynia ovate to round-ovate, 3-4 mm. long, rough-margined, strongly nerved on both sides. Eagle River; Griffin Lake; dry woods and banks.

19. *C. Leersii* Willd. Culms rather wiry, 1-4 dm. high; leaves 1-2.5 mm. wide; inflorescence linear, cylindrical, 1-3 cm. long, of 2-6 approximate or slightly distant, subglobose, 3-12-flowered spikes perigynia greenish-yellow, narrowly ovate, spreading at maturity and giving the spike a stellate appearance, 3-4 mm. long, exceeding the brown ovate, pointed scale. (*C. stellulata* Good.) Alaska southward. Var. *cephalantha* (Fernald). Coarser, 3-8 dm. high; inflorescence 3-8 cm. long, the spikes 10-40-flowered, perigynia ovate, 4 mm. long. The common form in Southern B.C. and V. I.

20. *C. scirpoides* Schk. Similar, slender or filiform, 1.5-5 dm. high; the 2-5 spikes small, all fertile, all sterile, or variously mixed, subglobose, the terminal clavate, perigynia merely margined, 3 mm. long, ovate, slightly cordate at base, olive-green or brown, much exceeding the blunt scales. V.I. to Hudson's Bay.

21. *C. tenuirostris* Olney. Low, 1-2 dm. high, stiff and erect, the leaves very narrow, somewhat shorter than the culm; head small, 12 mm. long or less, very light brown, ovoid; perigynium lanceolate and nearly terete below, slightly concave above, gradually narrowed to a point, lightly many nerved. (*C. Bonplandii* Bailey) Comox; Victoria; Wyoming westward.

22. *C. illota* Bailey. Very slender, 1.5-4.5 dm. high, stoloniferous; head 12 mm. long or less, dark brown; bracts scale-like, shorter than the head; perigynium stipitate, ovate, nerved, smooth on the edges. (*C. Bonplandii* Kunth vars. *minor* and *angustifolia*). Griffin Lake.

23. *C. arcta* Boott. Pale green, or somewhat glaucous; culms very soft, in loose tufts, 1.5-6 dm. high; leaves 2.5-4 mm. broad; spikes 5-13, ovoid or subcylindrical, the lower one or two subtended by short bracts; perigynia ovate, beak serrulate, strongly nerved on the outer, faintly on the inner, face, 2-3 mm. long, rather exceeding the acute scales. Common, swamps and ditches.

24. *C. canescens* L. Glaucous, culms soft, rather slender, in loose tufts, 1.5-6 dm. high; leaves 2-4 mm. wide, often exceeding the culms; spikes sessile, 4-7, cylindrical, somewhat crowded above, appressed; perigynia ovate-oblong, smooth or serrulate towards apex, margined, nerved on the outer face, 2.3-3 mm. long, a little longer than the pale, ovate, pointed scale. Common, Alaska to Wn. Var. *subloliacea* Laestad. More slender, spikes 4-7 mm. long or subglobose, often remote, perigynium smooth-beaked, about 2 mm. long, somewhat acute at base. With species; New Westminster.

24a. Var. ———. Spikes in a dense oblong or ovoid head, usually subtended by a bract 7 cm. long; perigynia acutish at base, tapering at apex to a nearly or quite smooth beak. Elgin. This combination of characters does not seem constant. The locality which, in 1913, produced this so distinct form, afforded, in 1915, only plants with dense but bractless heads.

25. *C. brunnescens* Poir. Similar, green culms very slender, roughish above, leaves 1-2.5 mm. broad, spikes subglobose or ellipsoidal, 3-7 mm. long; perigynia 2-2.7 mm. long, serrulate at base of the distinct beak, ascending or loosely spreading when mature, exceeding the thin brownish scale. Moist ground, Atlantic to Pacific; Crow's Nest Pass.

26. *C. Deweyana* Schwein. Very lax, glaucous, leaves soft, flat, 2-5 mm. wide, the 2-7 spikes 3-12-flowered, 5-12 mm. long, the lowest setaceous bracted, remote; perigynium rough-beaked, stipitate, rather exceeding the ovate, acuminate, pale thin scale. Quebec to Rockies. Var. *Bolanderi* Boot. Green; scales hispid-awned or hispid acuminate. The common form at the Coast. A low, tufted form occasionally found at the Coast, often with greenish-yellow leaves, distinguished from *C. Deweyana* by its long bracts exceeding the culms and from *C. læviculmis* by the longer perigynium, is doubtless a distinct species.

27. *C. læviculmis* Meinsh. Similar to *C. Deweyana*; culms 3-4.5 dm. high, very weak; smooth or rough; leaves 1.5-2 mm. broad; upper spikes contiguous, the lower remote, often setaceous-bracted, scales ovate, acute, ferruginous or pale, green-keeled; perigynia surpassing the scales, 2.5 mm. long, brownish-green, obscurely many-nerved on both sides, margined but not winged, suberect or finally slightly curved outwards, short-stipitate. (*C. Deweyana* var. *sparsiflora* Bailey). Swamps, Mt. Mark, V. I.; Alaska.

28. *C. heleonastes* Ehrh. Culms slender, stiff, very rough, 1.5-4 dm. high; leaves rigid, becoming involute, 1-2 mm. wide, shorter than the culm; spikes subglobose, brown, clustered at the summit; perigynia faintly nerved, 2 mm. long, serrulate at apex, gradually tapering to a short beak, about as long as the ovate, hyaline-margined obtuse scales. Arctic southward in Rockies.

29. *C. Lachenalii* Schk. Tufted; culms 1-2 dm. high, rather longer than the flat leaves; spikes 3-5, subglobose or ovoid, reddish-brown, contiguous or the lower a little remote, small, longer than the scale-like bracts; perigynia small, usually colored above, obovate-elliptical, rather thick in texture, with an abruptly contracted beak, longer than the ovate, brown, acute scale. Arctic regions southward in Rockies.

30. *C. macrocephala* Willd. Stout, 2-3 dm. high, from long rootstocks, leaves stiff, exceeding the culm; heads of 2 kinds on different plants, the staminate 1-1.5 cm. thick, the androgynous about 2.5 cm. thick, 4-6 cm. long, of closely aggregated spikes; stigmas 2 or 3; beak of perigynia longer than the body, bidentate, with a firm point; wings of the perigynium dentate. A sand-binder along shores, Gulf of Georgia; Vancouver.

31. *C. stipata* Muhl. Culms soft, sharp, 2-10 dm. high; leaves 4-15 mm. wide; head yellowish, 2-10 cm. long, often compound at base, rather dense, perigynia brown, lanceolate, 4-5 mm. long, narrowly winged, enlarged and spongy at base, tapering from base to tip; beak rough 1-2 times as long as the body, and much longer than the scales. Common; Vancouver and eastw.

32. *C. densa* Bailey. Heads dark brown, very dense, ovoid or nearly globose; lowest bract often conspicuous, setaceous, 2-3 cm. long; perigynium broadly lanceolate, thick, strongly nerved on both sides, wingless or slightly rough-margined above; produced into a long cylindrical cleft beak, much longer than the blunt or short-acute scale. (*C. Brongniartii* var. *densa*). Nootka.

33. *C. Hoodii* Boott. Culms slender, 3-6 dm. high, longer than the leaves; spikes several to many, few-flowered, head 1-2 cm. long, usually bractless; perigynium lanceolate, spreading, 3-4 mm. long, rough on the green margin and nerveless or nearly so at least on the inner face. Thickets, Agassiz to Eastern Kootenay.

34. *C. Douglasii* Boott. With creeping rootstocks, culms nearly smooth, 1-3 dm. high; leaves 1.5-2 mm. wide, sometimes exceeding the culm; spikes in a dense head 2-4 cm. long, some of them often entirely staminate; perigynia faintly nerved, narrowed at base, beak slender, more than half as long as the body, much shorter than the pale scarious awned or acute scale. Dry soil; Kamloops, Sask.

35. *C. incurva*. Lightf. Creeping; culm stiff, smooth, 3-15 cm. long, usually longer than the stiff, filiform, involute leaves; spikes 3-6 in a dense head; perigynia ovate, stipitate, spreading at maturity, lightly nerved, yellow-brown, contracted into a short, rough or smooth beak, rather longer than the acute, ovate, hyaline margined scales. Arctic; southward in Rockies.

36. *C. Gayana* Desf. Creeping culms 3-6 dm. high, scabrous; leaves 2-4 mm. wide, shorter than the culm; spikes chestnut, some of them often entirely staminate, perigynia nerveless or nearly so, broadly ovate with a short, entire beak, shorter than the broadly ovate, acuminate scales. Rockies.

37. *C. tenella* Schk. Culms filiform, 1-6 dm. high, leaves flat, soft; spikes 1-5-flowered, scattered; perigynia plump, finely nerved, longer than the white scales, often splitting at maturity. Wet woods and swamps, Atlantic to Pacific. Mt. Mark, V.I.; Kootenay.

38. *C. Hookeriana* Dewey. Very slender, head interrupted, castaneous, small, bracts of the 2 or 3 lower spikes produced into long awns surpassing the spikes; perigynium small, green, lightly nerved, gradually produced into a bidentate beak. Sask. and B.C. to Col.

39. *C. Sartwellii* Dewey. Culms stiff, 3-12 dm. high, from an elongate dark rootstock; leaves 2-5 mm. wide; staminate flowers variously disposed, whole spikes sometimes staminate; inflorescence 2.5-7 cm. long, the spikes usually clearly defined, tawny-brown; perigynium 3-5 mm. long, lance-elliptical, tapering gradually from below the middle to the beak, equaling the blunt scale. Eastern slope of the Rockies. Var. *occidentalis* Bailey. Head lighter colored, spikes more pointed, scales thin, whitish, very sharp, as long as, or longer than, the perigynia. Saline marshes, Kamloops.

40. *C. diandra* Schrank. Culms very rough above, 3-6 dm. high; leaves about 2 mm. wide; spikes in a rather close inflorescence 3-5 cm. long; perigynia ovoid, plump, dark brown, contracted to a long flat rough beak, about equaling the acute or short awned scales. Margins of ponds, Rockies and Selkirks. (*C. teretiuscula* Good). Var. *ampla* (Bailey). Stout, 6-12 dm. high, inflorescence simple or branching, 5-8 cm. long; perigynium almost 4 mm. long, the beak as long as the body. Common coast form. Var. *ramosa* (Fernald). Upper part of head often nodding, the usually pale spikes scattered, often compound below, perigynia brown. Rockies to V.I.

41. *C. camporum* Mack. Culm erect, 3-6 dm. high, sharply angled, rough, longer than the leaves which are 2-4 mm. wide; spikes dark brown, several, often staminate at base, inflorescence 3-4 cm. long, perigynia ovate, 3-4 mm. long, the winged margin serrate above, faintly nerved, a little shorter than the acuminate scale. (*C. marcida* in part). Dry flats, Spence's Bridge, Kamloops.

42. *C. alma* Bailey. Culm stiff, sharply angled, rough, 3-4.5 dm. high; shorter than the broad leaves, glaucous; inflorescence mostly compound, 8-10 cm. long, dull brown; bracts broad, tapering into an awn, shorter than the spikes; perigynia ovate, thin, small, margined, nearly nerveless, rough above, beak bifid; scales broadly ovate, acute. (*C. leiorhyncha*) Yale.

43. *C. siccata* Dewey. Rootstock long, culms slender, 3-6 dm. high; leaves 2 mm. wide, spikes 3-6 oblong or subglobose, 6-8 mm. long, brownish, usually clustered in a head; perigynia ovate-lanceolate, 5 mm. long, winged, beak long, oblique at apex. Dry soil, Spence's Bridge to Rockies. Allied to *C. pratensis*.

44. *C. sitchensis* Bong. Stout, usually in clumps, 3-9 dm. high; leaves dark-green, evergreen, rigid, often channelled, 5-10 mm. wide; bracts much exceeding the culm; staminate spikes 1-3, pistillate spikes 2-4, usually 2, sessile or short peduncled, spreading or usually drooping from the recurving base, 3-8 cm. long, usually tapering at the sometimes staminate apex; scales purple, much longer than the nearly beakless, nerveless, obovoid, slightly compressed perigynia. Swamps, Coast; Vancouver, Alaska.

45. *C. Barbaræ* Dewey. Rather stout, 6-9 dm. high, rough above or smooth; leaves 5-10 mm. wide, flat; staminate spikes 2-3, pistillate 3-5, often 8, cm. long, slender, 4-5 mm. thick, the upper sessile or short peduncled, the lower remote on peduncles 5-10 cm. long, all often staminate at apex, not so densely flowered as *C. variabilis*; perigynia oval or obovate, pale or purple-spotted, granulate, nerveless, the beak short, entire; scales white-backed, brown-margined, usually longer, lanceolate but blunt. Margins of ponds and lakes, Coast to Gold Range.

46. *C. Howellii* Bailey. Similar, stouter, 9-18 dm. high; 2 upper pistillate spikes on peduncles 12-24 mm. long; scales dull brown, perigynium narrowly elliptical, conspicuously granulate at maturity. Swamps, Coast, Alaska to Oregon.

47. *C. cryptocarpa* Meyer. Stout, not tufted, 4-9 dm. high; leaves light-green, 3-5 mm. wide, equaling the culm; staminate spikes 1-3; pistillate spikes 2-4, 2-6 cm. long, often staminate at apex, drooping on peduncles 3-8 cm. long; scales acuminate, purplish or brown, usually much longer than the light brown, or yellowish, nerveless, nearly beakless perigynia, which are about 3 mm. long. Salt marshes, Coast; Vancouver to Alaska.

48. *C. aurea* Nutt. Slender, 1-5 dm. high; leaves pale green, rather shorter than the culms, 1-3 mm. wide, the bracts exceeding the culm; spikes 3-5, loosely flowered, more or less peduncled, erect, 0.5-2 cm. long, the terminal sometimes pistillate above; perigynium 2 mm. long, plump, nerved, rounded at apex, obovoid brown or whitish, longer than the obtuse, sometimes cuspidate, whitish-brown scale. Wet meadows, V. I. to Rockies; Alaska.

49. *C. bicolor* All. Similar, some of the culms longer than the leaves, bracts exceeding the culms, or the upper spikes with bracts short, or none; perigynium nerved or nerveless, broadest just above the middle (ellipsoidal-obpyriform) more or less white-pulverulent, longer than the brown and white, obtuse scale. Thetis Lake, V.I.; Rockies.

50. *C. Tolmiei* Boott. Culm smooth or nearly so, 2-4 dm. high; leaves 4-7 mm. wide, mostly shorter; lower bracts shorter than or equaling the culm, often leafy, sheathless, auricled; pistillate spikes 2-5, 6-8 mm. thick, the upper contiguous, often staminate at apex, 8-24 mm. long, dark-colored, the lower usually peduncled; perigynia oval-oblong, compressed-trigonus, nerveless or slightly nerved, pale or more or less purple or purple-spotted at apex, short-beaked, either longer or shorter than the mostly blunt, dark-purple, broadly-ovate scale; stigmas 2 or 3. Alaska southward; South Kootenay Pass; Mt. Fernie.

51. *C. rigida* Good. Somewhat stoloniferous, culms mostly smooth, 0.5-45 dm. high, leaves smooth, dark green, revolute in drying 3-7 mm. broad, shorter than the mostly smooth culms; staminate spike 1; pistillate spikes 1-5, 0.5-2.5 cm. long, 4-6 mm. thick, the lowest bractless or leafy-bracted; perigynia elliptic, greenish or purplish, scales elliptic, dark. Alaska to California; Mts. or Northern; McLeod's Lake. Passing into the var. *Bigelovii* Torr. Loosely flowered, at least at base. V. I.; Rockies.

52. *C. nudata* Bott. var. *angustifolia* Bailey. Culms slender, rough, 2-4 dm. high, leaves 1-3 mm. wide; the lowest bract shorter than the culm; pistillate spikes slender, 1-2 cm. long, 2-3 mm. thick, sessile or nearly so, perigynia ovate, abruptly contracted to a short beak, purple at apex, very deciduous, shorter than the purple oblong, obtuse scale. Cascades to Mackenzie.

53. *C. invis*a Bailey. Culms 2-6 dm. high, smooth; leaves nearly as long, 2-4 mm. wide; pistillate spikes 2-4, 0.5-2.5 cm. long, the upper often erect, the lower clavate, drooping on long pedicels; bracts equaling the culm; perigynia elliptical-ovate, green or olive purple above, flat, short-beaked, usually longer than the purple, white-ribbed, acute scales. Summits, Selkirks and Rockies; Mt. Arrowsmith, V. I.

54. *C. aperta* Boott. Culms 3-6 dm. high, rough above, leaves 3-4 mm. wide, the lower bract nearly equaling the culm; pistillate spikes 2-4, cylindrical, 14-25 mm. long, the upper sessile, the lower somewhat remote and short-peduncled; perigynia nerveless, ferruginous, elliptical or roundish, short stipitate, with a short abrupt 2-toothed beak, broader and shorter than the lanceolate, brown or purple, acute or acuminate scale. Selkirks and Rockies; Kamloops, Castlegar.

55. *C. acutina* Bailey. Slender, 4-5 dm. high; leaves pale, flat, thin, about equaling the culm; the lower 1 or 2 bracts leaf-like, equaling the culm, their margins mostly serrulate; staminate spikes 1-2, sessile; pistillate spikes 2-3, sessile or the lower short-peduncled, 3-5 cm. long; perigynia oval, yellowish stipitate, somewhat inflated, slightly nerved, the short beak entire, shorter or longer and broader than the obtuse scale. Mts., Alaska to Colorado.

56. *C. aquatilis* Wahl. Glaucous, robust, 3-9 dm. high; leaves very long, 4-7 mm. broad, culms obtusely angled, smooth, leafy; bracts very long; pistillate spikes 3-5, 1.5-5.5 cm. long, 4-6 mm. thick, erect, very compactly-flowered, or the lower attenuate at base, sessile or peduncled below; perigynia small, flat, obovate to broadly elliptical, greenish nerveless; scales acutish, purple-margined, shorter than or equaling the perigynia. Wet meadows, Alaska to Wn.

57. *C. variabilis* Bailey. Similar; leaves narrower; 3-6 dm. high; the lower 1 or 2 bracts equaling or exceeding the acutely angled smooth or rough culm; pistillate spikes sessile above, borne near the top of the culm, or scattered, usually peduncled below, 3-5 cm. long, 5-6 mm. thick, the lower one or two conspicuously attenuate at base; perigynia broadly ovate, conspicuously broader and usually shorter than the obtuse or pointless scales. Var. *elatio*r Bailey. Much taller, leaves very long, narrower; spikes often 7-9 cm. long, more slender. Rockies; Victoria, and coast region; lake-margins and swamps.

58. *C. Nebraskaensis* Dewey. var. *prævia* Bailey. Rather stout, sharply rough-angled, 3-6 dm. high; leaves pale green, 4-6 mm. wide, not exceeding the culm; lower bract equaling the culm; pistillate spikes 2-4, 18-30 mm. long, 6 mm. thick, usually sessile; perigynia elliptical-obovoid, short-beaked, 2-toothed, longer than the ovate or lanceolate, brown scale. Wet places; Roger's Pass; Rockies.

59. *C. decidua* Boott. Tufted, 2-6 dm. high; leaves slightly glaucous, 1-4 mm. wide, equaling or shorter than the culm; bracts auriculate, the 2 lowest bracts equaling or longer than the culm; staminate spike peduncled; pistillate spikes 3-6, 2-4 cm. long, 3-5 mm. thick, often loosely-flowered at base, approximate, sessile or the lowest with a peduncle 0.5-3 cm. long; scales dark purple with a broad pale centre and often with a white scarious margin, acute, or usually obtuse, perigynia green or becoming tawny, deciduous, stipitate, longer and broader than the scales, the beak entire. Wet places, common, replacing the next in the south and west. Sometimes referred to *C. Kelloggii* Boott.

60. **C. Goodenovii** Gay. Similar, slightly cæspitose; culms smooth or rough above; leaves shorter than the culm, glaucous-blue; pistillate spikes all sessile or the lowest very short peduncled, with a bract 2-10 cm. long; perigynia oval or round-ovate, conspicuously longer and broader than the very obtuse scale. Alaska to Col., and eastward; Queen Charlotte Is.

61. **C. Mertensii** Prescott. Tufted, 5-9 dm. high, rough, leaves 6-10 mm. broad; bracts broad and leaf-like; spikes 5-8, all staminate at base, 2.5-4 cm. long, 7-8 mm. thick; the upper approximate, peduncled, the lower 1 or 2 remote, all more or less drooping; perigynia pale, very flat and thin, broadly winged, ellipsoidal or obovate, 4 mm. wide, with a short, entire beak; scales purple with a greenish midrib, acutish, shorter than the perigynia, stigmas 2 or 3. Coast Valleys; Cascades; Selkirks; Alaska.

62. **C. scirpoidea** Michx. Culms stiffly erect, rough above, 1.5-5 dm. high, exceeding the leaves; leaves flat, 2-3 cm. wide; fertile spike solitary, sometimes with a shorter spike below, 5-6 mm. thick, 2.5-4 cm. long; perigynia obscurely trigonous, 3 mm. long, whitish-pubescent, ovoid to obovoid, slightly, (sometimes much) exceeding the purple ciliate very narrowly hyaline-marginal scale. Alaska; Mts.; Rockies; Cascades.

63. **C. stenochlæna** (Holm.) Mackenzie. Perigynia lanceolate, flattish, 4 mm. long, black (at least towards the apex); scales oblong-ovate, black, with lighter midrib, and very narrow hyaline margins, as wide as the perigynia, but somewhat shorter. Mts.; Chilliwack River.

64. **C. scirpiformis** Mackenzie. Fertile spike 4-5 mm. thick, the staminate wider; perigynia obscurely trigonous, 2.5 mm. long; scales ovate, brownish, with a broad, hyaline margin, as wide and nearly as long as the perigynia. Banff; Golden.

65. **C. filifolia** Nutt. Tufted, culms smooth, slender, 1-3 dm. high, leaves filiform, spike staminate above, 6-30 mm. long, perigynia obovoid-oval, scabrous or slightly hairy above, abruptly contracted into a short entire beak, about equaling the very broad scarious-margined scale; stigmas 3, rarely 2. Dry plains, eastward.

66. **C. Geyeri** Boott. Stoloniferous; culms stiff, slender, 1.5-6 dm. high; leaves 1-2 mm. wide, equaling the culms; staminate flowers many, the pistillate 1-2 with leafy scales; perigynia tapering at base, green, 1-nerved, beak short, entire. Rockies.

67. **C. Backii** Boott. Tufted; culms 3-15 cm. high, shorter than the leaves; staminate flowers about 3, pistillate, 2-4; perigynia globose-ovoid, lightly nerved, the scales foliaceous, readily taken for bracts. Dry soil, Boston Bar; Rockies.

68. **C. pauciflora** Lightf. Culms smooth, 0.5-5 dm. high, leaves 1-2 mm. wide, shorter than the culm; pistillate flowers 2-5 at the base of the few staminate; perigynia 7-10 mm. long, lanceolate, greenish-yellow, reflexed, style persistent; scales deciduous, blunt, inconspicuous or $\frac{1}{3}$ - $\frac{2}{3}$ as long as the perigynia. Swamps; Vancouver; Rockies; Alaska.

69. **C. microglochin** Wahl. Similar 0.5-2 dm. high; perigynia closed by a conspicuous projecting racheola which springs from beneath the achene; scales short, deciduous. Wet ground, Rockies.

70. **C. nigricans** Mey. Culms not very slender, 5-15 cm. high; leaves nearly flat, 2-3 mm. broad; staminate flowers usually conspicuous and occupying about half the spike; perigynia dull, scales dark-brown. Common in mt. meadows, V. I. to Rockies; Alaska.

71. **C. pyrenaica** Wahl. Culms 5-15 cm. high, slender, spike dense, oblong, brown or purple, the fertile flowers erect until full maturity; leaves narrow, mostly involute-filiform, shorter than the culms; staminate flowers few, occupying on third or less the length of the spike; perigynia few-nerved or nerveless, usually shining at maturity, scales brown. Mt. meadows, V. I. to Rockies; Alaska.

72. *C. leptalea* Wahl. Culms filiform, 0.5-5 dm. high, rough above, longer than the narrow leaves; spike 0.5-1.5 cm. long, the staminate part small; perigynia green, nerved, blunt, oblong, longer than the thin, brownish, obtuse or acute, caducous, scales (*C. polytrichoides* Muhl.) Swamps, temperate North America.

73. *C. rupestris* All. Tufted, culms obtusely angled, 3-10 cm. high, a little longer than the leaves; spike linear, or clavate, 1-3 cm. long; perigynium erect, firm, dull, nearly nerveless, obovoid, abruptly contracted into a short, stout, entire beak, shorter than the clasping, broad, dark, obtuse scale. Arctic southward in Rockies.

74. *C. obtusata* Lilj. Creeping by long rootstocks; culms 5-15 cm. high, longer than the leaves; spike ovoid, 12 mm. long or less, pistillate flowers 4-10; perigynia horizontally bent, horny, glossy, ovoid, stipitate, contracted into a short, entire, hyaline tipped beak, longer and broader than the acute scales. Dry slopes, Bridge Creek, Fraser River; Rockies.

75. *C. ablata* Bailey. Not tufted, culms slender, 3-5 dm. high; much longer than the short, radical leaves; bracts sheathing; pistillate spikes 2-3 cm. long, the lower clavate and long-peduncled, the upper sessile or nearly so; perigynia spreading, lanceolate, green, becoming tawny, obscurely nerved, hairy on the angles, 2-toothed, longer than the acute or blunt, brown scales. Mt. Mark, V. I.

76. *C. lasiocarpa* Ehrh. Culm rather slender, 6-12 dm. high; smooth except near upper spikes; leaves very long, spikes 1-3 sessile, 2 or 3 cm. long, 5-7 mm. thick, often 1 dm. apart, with long, narrow bracts; perigynia short ovoid, the beak sharply bidentate, longer than the blunt or short-awned scale. (*C. filiformis* of American authors). Lakes, V. I.; Selkirks and eastward.

77. *C. lanuginosa* Mich. Similar, lower, culm mostly rough above, leaves 2-5 mm. broad; spikes 5 mm. thick, the lowest sometimes peduncled, bracts leafy, scales acuminate. Same range and extending northward.

78. *C. brevicaulis* Mackenzie. Densely tufted, culms rough, 5-10 cm. high, exceeded by the leaves, little red-fibrillose at base; leaves 1.5-3.5 mm. wide; staminate spike 6-9 mm. long, short-peduncled; pistillate spikes maturing 1-4 perigynia (the upper flowers not developing), 4-6 mm. long, nearly as wide, the uppermost sessile, the second if present sessile or somewhat peduncled, and somewhat remote; bracts leaf-like, rarely exceeding the culms, widened at the base to reddish-brown auricles; perigynia about 4 mm. long, loosely short-pubescent, stipitate, the body globose, beak slightly bidentate, 1 mm. long; scales ovate, acute to short-cuspidate, reddish-brown, narrower and shorter than the perigynia. Victoria; Vancouver.

79. *C. deflexa* Hornem. Loosely tufted; rootstock slender; culms smooth, 3-10 cm. high, very slender, exceeded by the leaves; blades 1-1.3 mm. wide, staminate spike sessile, 2-4 mm. long, inconspicuous, and often exceeded by the 1-2 sessile or short-peduncled, contiguous, suborbicular or short-oblong, 2-8-flowered, pistillate spikes; the bract of the lower 5-10 mm. long; perigynia puberulent, obovoid, stipitate, 2-5 mm. long, with a short slightly emarginate beak; scales reddish-brown, ovate, acute, wider but shorter than the perigynia. Grassy thickets; northern, lat. 54° to N.Y.

80. *C. Rossii* Boott. Mostly densely tufted; rootstock stout; culms smooth or nearly so, 5-10 cm. high, usually exceeding the leaves; blades 1-2 mm. wide; staminate spike 3-10 mm. long, sessile or nearly so, exceeding the 1-2 contiguous, sessile or short-peduncled, suborbicular or short-oblong, 3-10-flowered pistillate spikes; lower bract 5-80 mm. long; perigynia short-pubescent, 3-4.5 mm. long, obovoid, stipitate with a bidentate beak about 1 mm. long; scales ovate acute to short cuspidate, reddish brown, wider but slightly shorter than the perigynia. Dry woods; V. I. to Rockies; common in Kootenay.

81. *C. albicans* Willd. Slightly tufted; culms 1-5 dm. high, much exceeding the soft pale leaves (1.5-3 mm. wide); staminate spike short, often hidden, pistillate spikes 1-3, naked or subtended by a narrow bract, globose, mostly approximate; perigynia ellipsoidal, pubescent contracted at base, with a cylindrical beak, nearly $\frac{1}{2}$ as long as the body, exceeding the broad scales. Open woods and rocky banks. Yukon to Quebec.

82. *C. abdita* Bick. Densely tufted; culms rough, mostly much exceeded by the leaves, 4-15 cm. high, strongly fibrillose at base; leaves 1.5-3 mm. wide, very rough above; staminate spike 5-10 mm. long; pistillate spike usually present at its base, globose-oblong, 4-7 mm. long, its bract scale-like, reddish brown; perigynia 2.3-3.3 mm. long, the body triangular-globose, short-pubescent, stipitate, the beak 0.5-1 mm. long, obscurely bidentate: scales ovate longer and wider than the perigynia, greenish or hyaline, the upper at least reddish brown. (*C. umbellata* in part) Victoria; Fraser Valley; Rockies. (*C. globosa* Boott is Californian).

83. *C. Richardsonii* R. Br. Not tufted, 1-3 dm. high; leaves 2-4 mm. wide, shorter than the culm; sheaths of bracts bladeless, purplish, including, at least partly, the peduncles of the 1-3 pistillate spikes; these erect, 8-18 mm. long, quite separate from the short-stalked staminate spike which is 1.5-2.5 cm. long; perigynia obovoid, hairy, beak short, entire; scales brown, conspicuously white-margined, obtuse, mostly longer than the perigynia. Dry soil, Rockies to Cascades.

84. *C. concinna* R. Br. Loosely tufted, culms filiform, curving, 0.5-2 dm. high; leaves 1-3 mm. wide, shorter; bracts white or green bladeless sheaths, or the lower one subulate; staminate spike 4-7 mm. long, the upper pistillate spikes clustered at its base; pistillate spikes 2-3, 3-10-flowered, erect, 4-7 mm. long; perigynia blunt, ovoid, much exceeding the dark, pale-margined, roundish scales. Wooded or rocky banks, Rockies; Lake Louise.

85. *C. concinnoides* Mackenzie. Culms curving, 2.5 dm. high or less; leaves glabrous more or less glaucous, 2-4 mm. wide, the basal sheaths filamentose, pistillate spikes 1 or 2, erect, sessile or nearly so, 5-10 mm. long, approximate, the bract short, usually reddish; scales ovate-lanceolate, reddish-purple with hyaline margins; perigynia 2.5-3 mm. long, oblong-elliptical, short-stipitate, rather abruptly contracted into a short entire beak 0.5 mm. long; staminate spike 8-15 mm. long, nearly sessile. Selkirk; Deer Park; Rockies.

86. *C. communis* Bailey. In small tufts, culms 1-4 dm. high, much exceeding the leaves, which are 2-4 mm. wide; staminate spike sessile or nearly so, 4-15 mm. long; the pistillate 2-4, few-flowered, 5-8 mm. long, rather loose or sometimes scattered, the lowest usually leafy-bracted, perigynia hairy, 2.5-4 mm. long, sub-globose, very short-beaked, contracted at base, about equaling or a little shorter than the ovate, acutish, brownish scales. Dry open woods, Rockies; Selkirk; S. E. Kootenay.

87. *C. vespertina* Howell. Tufted, 2-5 dm. high, slender; leaves 1-2 mm. broad, shorter than the culm, the basal sheaths often fibrillose; the lower bract leaf-like, short; staminate spike nearly sessile, 2-3 cm. long; pistillate spikes 2, subglobose, few-flowered, 5 mm. long, or less; perigynia ovoid, brownish puberulent, the beak short-cylindrical, shorter than the ovate, brown, scarious-margined, acute scale. Dry hillsides; V. I. and eastward.

88. *C. flava* L. Tufted, 2-8 dm. high, yellowish, leaves 2-5 mm. wide; bracts long; staminate spike sessile or nearly so, pistillate spikes 2-6, 0.8-15 cm. long; perigynia yellowish, strongly nerved, with a deflexed beak, twice as long as the blunt brown scale. Wet meadows, Columbia Valley. Var. *recterostrata* Bailey. Low, 2 dm. high, green, leaves 1-3 mm. wide, often exceeding culms; perigynia straightish, the beak only slightly deflexed. Bowen Is.; V. I.

89. *C. Oederi* Retz. Similar, green, 0.5-3 dm. high, leaves 1-3 mm. wide; pistillate spikes 2-4, mostly scattered, often one basal, many of them often staminate at the apex, 4-15 mm. long; the greenish, plump, nerved, short-beaked perigynia usually spreading, one-half longer than the obscure scale. Gravelly shores of lakes and streams, V.I. and eastward. Var. *pumila* Fernald. Plant 0.5-6 dm. high; pistillate spikes 3-10, mostly crowded, often in 2 groups, the lowest spike often peduncled, the bracts often over 1 dm. long. Cameron Lake, V.I.

90. *C. Gmelini* Hook. Culm 3 dm. high, rough on angles above; leaves linear, as long as the culm or nearly so; bracts leafy, not sheathing; spikes generally 4, oblong or sub-clavate, all more or less stalked, especially the lower one, erect, approximate; scales ovate; long-cuspidate, with a scabrous rigid point, dark brown, closely imbricated, about as long as the perigynia; perigynia elliptical, compressed, conspicuously stipitate, striate; beak short, entire. Oregon to Alaska; Cascades.

91. *C. atrata* L. var. *ovata* Boott. Tufted, 1-6 dm. high; culm sharp, rather longer than the leaves; spikes 1-2 cm. long, at least the lower one or two on slender peduncles, all staminate at base; perigynia ovate to orbicular, nerveless, greenish-white, slightly granulate, the beak notched, very short, about as long as the blunt or acute reddish-brown to purple scale. Wet places, Coast to Rockies; Alaska. Var. *nigra* Olney. Spikes sessile, globose-ovoid, scales black. Selkirk.

92. *C. Halleri* Gunn. Slender, 1-6 dm. high, culms obtuse, longer than the leaves; spikes sessile or the lower short-stalked, 2-4, in a head, 4-8 mm. long; perigynia pale, elliptical to orbicular, nerveless or slightly nerved; the beak short, slenderly cylindrical, slightly toothed, a little longer than the ovate, purple, obtuse scales. (*C. alpina*) Alaska, southward in mts.

93. *C. polygama* Schkr. Rather slender but stiff, 2-9 dm. high; culm sharp, roughish above, mostly longer than the narrow leaves; spikes 2-7, sessile or the lowest, short-stalked, the terminal seldom all staminate, 0.7-5 cm. long, dark; perigynia elliptical, very short-beaked, whitish, granular, shorter than the lance-ovate scales. (*C. Buxbaumii*). Bogs, Atlantic to Pacific; Horne Lake; Roger's Pass; Alaska.

94. *C. Parryana* Dewey. Slender, 2-5 dm. high; leaves 2 mm. wide, shorter than the culm, somewhat involute; spikes 1-4 erect, sessile or the lowest peduncled, often staminate at base; perigynia obovate, pale, less than 2 mm. long, minutely granular, barely beaked, the orifice entire, equaling the dark-brown scale. Rockies.

95. *C. stylosa* Meyer. Slender, 3-5 dm. tall; leaves 3 mm. wide, usually shorter than the culm; the staminate spike often half pistillate; pistillate spikes 2-3, 8-12 mm. long, the lowest peduncled; perigynia ovate, brown, granulate, less than 2 mm. long, nerveless, beakless, exceeding the black obtuse scale. Alaska southward.

96. *C. vaginata* Tausch. Very slender, strongly stoloniferous, 2-8 dm. high, leaves 1.5-4 mm. broad, soft; bracts short; staminate spike long-peduncled, pistillate spikes more or less spreading, peduncled; perigynia lightly nerved or nerveless, with a slender beak half as long as the body, longer than the acute scales. Alaska southward in mts.

97. *C. Hendersoni* Bailey. Pale green, 3-6 dm. high, leaves soft, 5-10 mm. wide; bracts long, with sheaths; staminate spike short-peduncled; pistillate spikes approximate above, one very remote, 1.5-4 cm. long, erect; perigynia nerved, obovoid, 3-angled, short-beaked, longer than the mucronate obtuse scale. Woods, Yale to V. I.

98. *C. eburnea* Boott. Pale green, tufted, culms filiform, 1-4 dm. high, longer than the involute filiform leaves; bracts bladeless sheaths; staminate spike 4-7 mm. long, sessile or short-peduncled, exceeded by the 2 upper pistillate spikes; pistillate spikes 2-4, peduncled erect, 2-6 flowered; perigynia

1.5-2 mm. long, nearly nerveless, smooth, black and shining at maturity, more or less nerved, very short-beaked; scales white, obtuse, shorter. Dry or rocky soil. Golden; MacKenzie.

99. *C. misandra* R. Br. Culms sharp, 1-4 dm. tall; leaves 2-3 mm. wide, short; the terminal spike often partly pistillate; pistillate spikes 1-3, peduncled, 6-15 mm. long; perigynia narrowly lanceolate, acuminate, narrowed at base, 3 mm. long, brown, rough above, rather longer than the obtuse scale; stigmas 2 or 3. Arctic, southward in Rockies to Col.

100. *C. capillaris* L. Tufted, culms very slender, 0.5-2.5 dm. high, smooth, longer than the narrow leaves; bracts sheathing; pistillate spikes 1-4, all more or less peduncled and drooping, small, 3-12-flowered; perigynia oblong or obovoid, with a nearly entire hyaline-tipped beak $\frac{1}{2}$ its length; scales whitish, obtuse, shorter than the small perigynia. Borders of streams, Rockies; Selkirks, and northward.

101. *C. paupercula* Michx. var. *irrigua* Fernald. Tufted, 1-8 dm. high; leaves 2-3 mm. wide, shorter than the culm; bracts broad-based or leafy, nearly equaling the culm; pistillate spikes about 3, 1-2 cm. long; staminate spike often wanting, pistillate spikes more or less staminate at base; perigynia minutely granulate, broadly elliptical, few nerved, shorter than the purple-brown acuminate scales. Swamps, Mt. Mark, V. I.; Lower Fraser, and in Eastern America. Var. *pallens* Fernald. Culms usually rough; scales green with pale-brown or yellowish margins. Quebec to B.C.

102. *C. limosa* L. Slender, not tufted, 2.5-5 dm. high; leaves 1-2 mm. wide; bracts filiform; staminate spike long-peduncled; pistillate spikes 1-2, on filiform peduncles, 1-2 cm. long; perigynia pale, nerveless, minutely granulate, orbicular, beak very short, entire, hardly equaling the brown scale with its rough short awn. Swamps, V. I. to Atlantic. A closely allied form from the Selkirks with purple, awned scales and 2-3 pistillate spikes, the lower on peduncles 4-5 cm. long, I have not been able to place. It occurred with *C. invis*a, and may be a 3-stigma form of that species.

103. *C. heteroneura* Boott. Culms sharply angled, 3-6 dm. high, longer than the narrow flat leaves; the lower bract auriculate, nearly as long as the stem; pistillate spikes sessile, or the lower very short-peduncled, about 12 mm. long and 6 mm. thick, contiguous; perigynia oval, straw-colored, very short-beaked, longer and broader than the purple white-ribbed scale. S. Kootenay Pass.

104. *C. Reynoldsii* Dewey. Culms sharply angled, 1.5-6 dm. high; leaves glaucous, abruptly pointed; staminate spike sessile, about 12 mm. long; the lowest bract of the culm bearing conspicuous purple auricles; pistillate spikes 10-25 mm. long, and 6-8 mm. thick, sessile or short-peduncled; perigynia large, obovoid, 3-angled, prominently nerved, green, or light-colored; finally somewhat spreading, with a purple beak, much longer than the scale. Mt. valleys; Spence's Bridge.

105. *C. livida* Willd. Pale green, glaucous, leaves 2-4 mm. wide, bracts usually short; staminate spike peduncled; pistillate spikes 1-2.5 cm. long, 1-3, approximate or remote, sessile or nearly so, or a remote and even basal one peduncled; perigynia nerved, granular, beakless, mostly a little shorter than the obtuse, brown scale. Bogs, Alaska to California; Roger's Pass.

106. *C. amplifolia* Boott. Stout, 6-9 dm. high, sharply angled, rough above; leaves 10-16 mm. wide, usually exceeding the culm; pistillate spikes 4-6, mostly peduncled, 3-9 cm. long; perigynia elliptical, few-nerved, abruptly narrowed into a whitish beak about as long as the whitish, purple-margined awn-pointed scale. Wet places, Okanagan.

107. *C. salina* Wahl. var. *robusta* Bailey. Culms tall and stout, 6-9 dm. high, spongy at base; bracts very leafy, surpassing the culm; spikes heavy, short and thick, usually 2.5 cm. long or less, and nearly 12 cm. thick, mostly dense and truncate at base, somewhat aggregated, the lower stalked; scales

lanceolate and acute to ovate and obtuse, brown with a white mid-nerve, longer than the nerveless or lightly nerved semi-inflated, nearly beakless perigynia. Saline habitat, Qualicum River, V. I.

108. *C. physocarpa* Presl. Culms 2-3 dm. high, rough on the acute angles; leaves 4-5 mm. wide equaling or exceeding the culm; staminate spikes 2 or 3; pistillate 2 or 3, 2.5 cm. long, erect, cylindrical, on peduncles reaching 3.5 cm. in length; scales oblong, brown, acute, equaling the perigynia; perigynia ovoid, inflated, 6-nerved, with a short bidentate beak. Related to *C. vesicaria*, but with 2 stigmas. Nootka; Donald; Sicamous.

109. *C. saxatilis* L. Stoloniferous, 1-3 dm. high; leaves 2-5 mm. wide; staminate spike 1, pistillate spikes 1-3, erect, sessile or the lower peduncled, dark purple, short; 0.5-2 cm. long, 5-8 mm. thick, perigynia purplish, slightly inflated, lightly nerved or nerveless, ovoid, 3-4 mm. long, with a short subentire beak, slightly exceeding the purple or white pointed scale, stigmas usually 2. Rockies; Col. northward.

110. *C. Grahami* Boott. Slender, 2-7 dm. high; leaves 1.5-3 mm. wide; staminate spikes 1-3; pistillate spikes 1-3, erect, 1-2 cm. long, 6-10 mm. thick; perigynia slightly inflated, yellowish, ovoid, 4-5 mm. long, few-nerved, with a short, sub-entire beak, twice as long as the blunt, purple scale. Rockies; Col. northward. (*C. saxatilis* var. *Grahami*).

111. *C. comosa* Boott. Stout, 6-9 dm. high, leaves 1 cm. broad; staminate spike 1 or wanting, often pistillate above; pistillate spikes 4-6, yellowish, peduncled, more or less drooping, 3-5 cm. long, approximate; perigynia not inflated, nerves prominent, crowded, beak with long spreading teeth, twice as long as the narrow rough-awned scale. Kootenay.

112. *C. retrorsa* Schwein. Stout, 4-10 dm. high; culm nearly smooth, leaves 5-10 mm. wide; pistillate spike 1, sometimes with small ones at its base, often pistillate below; pistillate spikes yellow, several, mostly rather closely aggregated, often one remote, and long-peduncled; perigynia 6-10 mm. long, nerved, becoming strongly retrorse, twice as long as the smooth narrow scale. Wet places, Atlantic to Pacific. New Westminster.

113. *C. hystericina* Muhl. Slender, 3-6 dm. high, leaves 3-6 mm. wide; staminate spike 1; pistillate spikes yellowish, 2-4, 2-5 cm. long, mostly peduncled and drooping, not approximate; perigynia hardly inflated, strongly nerved, the teeth of the slender beak short and straight; the narrow scale nearly equaling the perigynia. Alberta to Wn.

114. *C. exsiccata* Bailey. Stout and tall, leaves 6-10 mm. wide, more or less nodulose (at least when dry); bracts very long; staminate spikes 1-3, often partly pistillate; pistillate spikes 1-3, 3-8 cm. long, scattered; sessile or the lower short-peduncled; perigynia not strongly inflated, ascending, usually rusty-red; 7-11 mm. long, very strongly nerved, twice as long as the smooth scale. Common in bogs; V. I.; New Westminster; Gold Range. Var. *globosa* Bailey. Spikes 2.5 cm. long or less; perigynia conspicuously spreading; scales hyaline, very small. Sicamous to V. I. Var. *pungens* Bailey. Slender; spikes slender, usually dark, scales firm, half as long as the perigynium. Agassiz; Cameron Lake, V. I.

115. *C. rostrata* Stokes. Culms tall and stout, generally bluntly angled, spongy at base; leaves pale or glaucous, often 1 cm. wide, nodulose; staminate spikes 2-4; pistillate spikes 2-4, sessile or the lower peduncled, 2-8 cm. long; 1 cm. thick; perigynia ascending or spreading, 4-6 mm. long; somewhat exceeding the narrower, nearly smooth-tipped purplish scale. Var. *utriculata* Bailey. Coarser, spikes often longer and thicker; perigynia 5-10 mm. long, the scale usually rough-awned. Species and var. common in wet places; V. I. to Atlantic.

116. *C. vesicaria* L. Not quite so stout, culms sharply angled and usually rough; leaves 4-7 mm. wide; staminate spikes 2-3; pistillate spikes 2-3, sessile or short-peduncled, remote, 2-7 cm. long, 1-1.5 cm. thick; perigynia slightly

turgid, 7-9 mm. long, nearly twice as long as the smooth acute scales. Low ground; Coast eastward and northward. Var. **monile** Fernald. Perigynia 6 mm. long, more turgid. Cascades eastward; Alaska.

3. CYPERUS (GALINGALE)

Sedge-like plants with triangular culms leafy at base and with one or more leaves at the summit forming an involucre to the inflorescence; stamens 1-3, styles 2-3-cleft, deciduous; achene lenticular or triangular; spikelets in clusters or heads. A rather large genus represented in B.C. by one species.

1. **C. inflexus** Muhl. Dwarf 2-20 cm. high; spikelets brown, oblong, becoming linear, 7-20-flowered in 1-5 ovoid heads; scales with a long, recurved point; stamen 1; achene obovate (*C. aristatus*). Wet sandy shores, Somas Falls, Alberni.

4. DULICHIMUM

Grass-like plants with terete, hollow culms and 2-ranked spikelets on axillary peduncles; perianth of 6-9 barbed bristles; stamens 3, style 2-cleft, persistent; achene flattened, linear-oblong.

1. **D. arundinaceum** (L.) Brit. Culms leafy to the top, 4-6 dm. high; the lower leaves reduced to sheaths. (*D. spathaceum*). Swamps, Atlantic to Pacific; Vancouver.

5. ERIOPHORUM (COTTON GRASS)

Perianth bristles very numerous, greatly elongated, silky, not barbed; spikelets solitary or several, usually with some empty scales at the base; flowers perfect, stamens 1-3, style 3-cleft; achene trigonous. (Greek *erion*, wool, *phoros*, bearing).

Spikelets solitary, the lowest scale enlarged.

Culms mostly solitary, thick and soft.

Bristles tawny

Bristles white

Culms tufted, stiff and wiry

Spikelets several, involucre of leafy bracts.

Involucral bract one

Involucral bract 2 or more

1. *E. Chamissonis*.

1a. *E. Chamissonis* var. *albidum*.

2. *E. callitrix*.

3. *E. gracile*.

4. *E. polystachion*.

1. **E. Chamissonis** Mey. Culms rather soft, 2-6 dm. high; the upper sheaths slightly inflated, nearly or quite bladeless; basal leaves slender, channeled; flowering spikelet 1.5-2 cm. long, becoming twice as long; empty scales 10 or fewer, acute or bluntish. Common in bogs. Var. **albidum** Fernald. Bristles white. Alaska southward; Rockies; New Westminster.

2. **E. callitrix** Cham. (HARE'S TAIL). Culms stiff and wiry, densely tufted, scabrous at tip, 1.5-4 dm. high; basal leaves filiform trigonous, scabrous; upper sheaths bladeless inflated; flowering spikelet 0.8-1.5 cm. long; scales ovate-lanceolate, long-acuminate (*E. vaginatum*). Alaska southward; Rockies.

3. **E. gracile** Koch. Culms slender, scabrous on the angles, 2-6 dm. high; leaves linear, upper cauline leaf 1-4 cm. long; spikelets 2-5, mostly on slender pubescent peduncles, at flowering 7-10 mm. long, becoming twice as long, achenes oblong, 1.5-2 mm. long. Alaska to Wn.

4. **E. polystachion** L. Culms stoutish, leafy, angled above; leaves 2-4 mm. broad, flat at base, the upper 3-10 cm. long; spikelets 3 or more on glabrous stout peduncles, at flowering 1-2 cm. long, becoming twice as long; achene obovoid, 2-3 mm. long. Horne Lake, V. I.; Selkirks; Mt. Cheam; Alaska.

For *Eriophorum alpinum* L. v. *Scirpus*.

6. SCIRPUS (BULRUSH, CLUB RUSH)

Spikelets solitary, clustered or somewhat umbellate, the inflorescence subtended by 1 or more often leafy bracts, or naked, appearing lateral when there is 1 bract; perianth represented by 2-6 smooth or usually downwardly barbed bristles; styles and stamens 2 or 3, the style deciduous. (The Latin name of the bulrush).

- Spikelet solitary.
 Bristles long smooth and silky, as in *Eriophorum* 1. *S. hudsonianus*.
 Bristles short.
 Involucral bracts wanting.
 Achene 1 mm. long, constricted below the beak 2. *S. nanus*.
 Achene 2 mm. long, the beak continuous with the body 3. *S. pauciflorus*.
 Involucral bract present.
 Bristles wanting 4. *S. riparius*.
 Bristles present.
 Bristles smooth, the bract about equaling the spikelet 5. *S. cæspitosus*.
 Bristles barbed, the bract 2 or 3 times as long as the spikelet 6. *S. subterminalis*.
 Spikelets several to many.
 Culms terete.
 Spikelets sessile or nearly so 7. *S. nevadensis*.
 Spikelets peduncled.
 Spikelets ovoid, achenes nearly equaling the scales 8. *S. validus*.
 Spikelets cylindrical, achenes much shorter than the scales 9. *S. occidentalis*.
 Culms 3-angled.
 Involucral leaf 1. 10. *S. americanus*.
 Involucral leaves 2 or more.
 Spikelets 1-2 cm. long, scale awned. 11. *S. robustus*.
 Spikelets less than 1 cm. long, scale awnless.
 Achenes 3-angled, styles 3 12. *S. atrovirens*.
 Achenes plano-convex, styles 2 13. *S. microcarpus*.

1. ***S. hudsonianus*** (Michx.) Fernald. Culms scabrous, very slender, 2-3 dm. high, somewhat tufted; leaves trigonous, scabrous; bracts wanting; several empty brown scales at the base of the spikelet; bristles white, crisp, 3 cm. long. Swamps. (*Eriophorum alpinum* L.) Selkirks and Gold Range; northw.

2. ***S. nanus*** Spreng. Culms filiform flattened, 2-7 cm. high; bearing bladeless sheaths near the base; spikelet 2-3 mm. long, the scales ovate; bristles about 6, longer than the trigonous achene. (*Eleocharis pygmæa* Torr.) Salt marshes, Alberni.

3. ***S. pauciflorus*** Lightf. Culms striate, angled, very slender, 0.5-2 dm. high; scarcely tufted, with a short truncate sheath at base; bristles 3-6, about as long as the trigonous achene. Swamps; Rockies.

4. ***S. riparius*** Spreng. Tufted, 0.5-2 dm. high; very slender, sheathed at base, the upper sheath usually bearing a small leaf; involucral bract usually not longer than the spikelet; spikes ovoid-oblong, 3-6 mm. long; scales pale or brown; achene obovoid, angled, brown. Marshy places reached by high tide, Victoria; Alberni.

5. ***S. cæspitosus*** L. Culms slender, tufted, terete, 1-3 dm. high; the upper sheath bearing a blade a few mm. long; spikelet 4 mm. long, the bract merely an enlarged scale with a rigid awn, deciduous; bristles nearly twice as long as the achene. Swamps; Alaska, Selkirks and Rockies.

6. ***S. subterminalis*** Torr. Culms 3-9 dm. high; bearing an apparently lateral spikelet near the top; leaves filiform immersed; spikelet ovoid-oblong, 6-10 mm. long; scales green or straw-colored, pointed; bristles not longer than the trigonous achene. Aquatic. Mt. Mark, V. I.; Revelstoke; Rockies.

7. ***S. nevadensis*** Wat. Culms 1-5 dm. high; leafy, leaves channelled or revolute, rough margined; spikelets 1-8, clustered, 8-15 mm. long; scales brown, carinate; bristles 1-3, not half as long as the plano-convex achene; styles 2. Moist alkaline soil, Spence's Bridge.

8. *S. validus* Vahl. Culm stout, soft, light green, 1-2.5 m. high, 1-2.5 cm. thick at base, basal sheaths soon lacerate; panicle lax, rays 1-6 cm. long, lateral; bractlets brownish, pubescent at tip; spikelets solitary or in glomerules, reddish-brown, ovoid, 5-10 mm. long; scales suborbicular; achene whitish or dull black, plano-convex, 1.3-1.5 mm. broad, nearly equaling the scales. Margins of ponds, V. I. eastward; Vancouver.

9. *S. occidentalis* (Wats.) Chase. Similar; Culms dark green; bractlets red-spotted, viscid at tip; spikelets mostly in glomerules, sub-cylindrical 1-2 cm. long; scales oblong-ovate, red-dotted; achene biconvex 1.7-1.9 mm. broad. Margins of ponds. Cascades; Kootenay, and eastward.

10. *S. americanus* Pers. Rushlike with running rootstocks, culms 3-5 dm. high; stoutish with 1-3 leaves below, the angles sharp or obtuse; involucre leaf 2-3 cm. long; spikelets usually 3, ovoid, sessile, the broad red-brown scales notched, short-awned; anthers with a short apical appendage; styles 2 or 3, bristles 2-6. Sea shore. Vancouver, Alaska.

11. *S. robustus* Pursh. Sedge-like; culms, leafy, stout, 6-10 dm. high; leaves 5-10 mm. broad; involucre bracts 3 or 4, the longest 2-3 dm. long; spikelets chestnut, few to many, sessile or usually some of them peduncled; scales puberulent; bristles unequal, some of them flattened and smooth; achene reticulated, brown, 2 mm. broad. Salt marshes, Coast; Vancouver; Sask.

12. *S. atrovirens* Muhl. Culms rather slender, 6-10 dm. high, the lowest leaves nodulose-reticulate; spikelets greenish, 4-8 mm. long, in glomerules of 10-20 which form a rather loose inflorescence; bristles barbed to the middle, as long as the obovoid, pale-brown achene. Swamps, Atlantic to Pacific; Vancouver.

13. *S. microcarpus* Presl. Culms stout and leafy, 6-15 dm. high; leaves 8-12 mm. wide; involucre bracts usually exceeding the inflorescence; panicle large, loose, spikelets in glomerules of 3-20; spikelets 3-4 mm. long, scales greenish; bristles 4, barbed nearly to the base, about twice as long as the smooth, whitish, obovate achene. Swamps, Common, Alaska to Wn.

7. ELEOCHARIS (SPIKE RUSH)

Rush-like leafless plants, the culms in tufts, with a single short terminal spike; perianth of about 6 barbed bristles, the base of the style bulbous persistent as a tubercle jointed on the top of the ovary or sometimes confluent with the ovary. (Greek *helos*, a marsh, *charis*, grace; the name sometimes spelled *Heleocharis*).

Styles 3-cleft, achenes trigonous.

Stems capillary, achene ribbed 1. *E. acicularis*.

Stems not capillary, achene smooth 2. *E. rostellata*.

Styles 2-cleft, achenes lenticular.

Plants tufted, tubercle not constricted basally. 3. *E. obtusa*.

Plants not tufted, tubercle ovoid, constricted basally 4. *E. palustris*.

1. *E. acicularis* (L) R & S. Tufted, capillary basal leaves often present, culms capillary, 3-10 cm. high (or longer if submersed) more or less 4-angled; spikelet 2-6 mm. long, scales greenish with purple sides; achenes ribbed, trigonous, longer than the 3 or 4 fugacious bristles; the distinct tubercle $\frac{1}{4}$ the length of the achene. Atlantic to Pacific, in muddy places; Alaska, New Westminster.

2. *E. rostellata* Torr. Culm flattened, 3-12 dm. high, the sterile ones reclining and rooting at the tip; spikelet spindle-shaped, scales ovate, obtuse, light brown; styles 3, achene trigonous obovoid, smooth, shorter than the 4-6 bristles, tubercle not constricted at base and apparently confluent with the achene. Marshes, Alberni; Kootenay.

3. *E. obtusa* (Willd.) Schultes. Tufted annual, stems slender, 0.5-5 dm. high; spikelets ovoid to oblong obtuse, 3-13 mm. long; scales ovate obtuse, brown; style usually 2-cleft; achene obovoid, shorter than the 6-8 bristles. New Westminster; Atlantic to Pacific.

4. *E. palustris* (L.) R & S. Not tufted; stems stout, 2-10 dm. high; spikelet 1-2 cm. long, pointed; scales ovate-oblong, reddish-brown, bristles 4, longer than the obovoid lenticular achene, tubercle ovoid, pointed. Water or swamps, common. V.I. to Rockies; New Westminster.

8. RYNCHOSPORA

Spikelets in 1 or 2 dense heads, teretish, scales concave, the lower empty perianth of bristles, stamens 2 or 3, achene lenticular, crowned with a beak.

1. *R. alba* (L.) Vahl. Culm slender, 2-5 dm. high, triangular above; leaves filiform; spikelets becoming whitish; maturing a single flower; achenes smooth, obovate, scarcely longer than the beak, shorter than the 9-20 bristles, which have barbs retrorse above and erect below. Common in swamps; V. I. to Alaska; Vancouver.

ARACEÆ (ARUM FAMILY)

Flowers crowded on a fleshy spadix, surrounded by a spathe; perianth none, or of 4-6 sepals; styles short or wanting.

Spathe long, yellow; perianth present	1. Lysichiton.
Spathe short, whitish; perianth wanting	2. Calla.

1. LYSICHITON (YELLOW ARUM)

Acaulescent herbs with large leaves, the spadix finally extending beyond the spathe; ovary conical, 2-celled, somewhat sunk in the spadix; stamens 4, opposite the 4 sepals.

1. *L. kamtschaticense* Schott. (SKUNK CABBAGE). Leaves often 1m. long, acute, spathe yellow, 1-2 dm. long, with a sheathing base. Common in low wet woods, V. I. to the Columbia; Alaska. A form at Kaslo with obtuse leaves and spadix and peduncles both rather shorter than is usual at the coast, though the leaves are quite as long, may be a variety.

2. CALLA (WATER ARUM)

Low perennials; flowers, at least the lower perfect ones, without perianth; Spathe ovoid, abruptly pointed, white without; ovary 1-celled, becoming a reddish, few-seeded berry.

1. *C. palustris* L. A few dm. high; leaves round-cordate, abruptly pointed, long petioled. Wet ground and bogs; Hazelton, the only B. C. station, far west of its range. (T. Wilson).

LEMNACEÆ (DUCKWEED FAMILY)

Floating, stemless plants consisting of a flat, leaf-like disk or frond with one or more rootlets on the lower surface and monœcious flowers embedded in the disk; stamens 1-2, ovary 1-celled, ovules several. The simplest and smallest of our flowering plants, sometimes propagating in autumn by minute bulblets; flowers and fruit scarce.

Frond 7-nerved, rootlets several	1. Spirodela.
Frond 1-3-nerved, rootlet solitary	2. Lemna.

1. SPIRODELA

Anthers longitudinally dehiscent; ovules 2; rootlets several; closely resembling *Lemna*.

1. *S. polyrrhiza* Schleid. Fronds round-obovate, 3-8 mm. long, thick, purple beneath, dark green above; frond palmately (usually 7-) nerved; fruit unknown. Agassiz; Sicamous and eastward.

2. LEMNA (DUCKWEED)

Flowers produced from a marginal cleft in the frond, usually in 3's (but apparently a single diandrous flower) 2 of them consisting of a single stamen with a slender filament, the third, of a 1-celled ovary with a truncate or funnel-form stigma; fronds with a single rootlet; anthers transversely dehiscent.

1. *L. trisulca* L. Fronds oblong to oblong-lanceolate, 6-10 mm. long, attached at base to a slender stalk, remaining connected, obscurely 3-nerved, denticulate at apex, often without rootlets. Temperate N. A.; Cedar Hill, Victoria.

2. *L. minor* L. Fronds round to elliptical obovate, rather thick, 2-5 mm. long, obscurely 3-nerved, without a stalk, soon separating. Common, Vancouver.

JUNCACEÆ

Annual or perennial, grass-like herbs; stems hollow, or spongy; leaves flat or terete, flowers liliaceous in structure, small, scarious, in heads, spikes or panicles; sepals and petals 3, similar, stamens 6 or 3, ovary superior with 3 filiform stigmas and 1 or 3 cells.

Capsule 3-seeded, 1-celled, plants often hairy

Capsule many seeded, usually 3-celled, plants never hairy

1. *Luzula*.

2. *Juncus*.

1. LUZULA (WOOD RUSH)

Perennials with soft, flat leaves, hollow stems, and spiked, crowded or umbelled flowers. Plants of dry woods. (Latin *lux*, light, suggested by leaves of a species shining with dew *juncoides*).

Flowers solitary on slender pedicels.

Inflorescence umbellate 1. *L. saltuensis*.

Inflorescence paniculate.

Panicle drooping 2. *L. parviflora*.

Panicle not drooping 3. *L. divaricata*.

Flowers in clusters.

Inflorescence nodding, a single spike of sessile heads 4. *L. spicata*.

Inflorescence not spicate, the flower clusters stalked or congested 5. *L. campestris*.

1. *L. saltuensis* Fernald. Often stoloniferous, 1-4 dm. high; leaves hairy, the basal 5-10 mm. wide, sepals and petals 2 mm. long, pale brown or straw-colored, with hyaline margins shorter than the pointed capsule; seeds with a hooked appendage. (*J pilosum* Coville) Oregon to Alaska, eastward.

2. *L. parviflora* Desv. Nearly smooth, the basal 5-13 mm. wide; corymb decomposed, loose, the pedicels drooping; sepals and petals 2-3 mm. long, ovate, acute, equaling the short-pointed capsule, all light-brown or becoming dark-brown; seeds oblong, dark-brown, not appendaged; filaments shorter than or equaling the anthers. Common; Cal. to Alaska. *L. Piperi* (Cov.) Leaves thicker, duller green; flowers darker brown; seeds lighter brown more sharply pointed. Mts.

3. *L. divaricata* Coville. Similar; inflorescence branches divaricately spreading, seed light colored, with a small appendage at base. Vancouver and V. I.

4. *L. spicata* (L.) DC. Densely tufted, 1-4 dm. high; leaves 4-6 mm. wide; flowers in sessile clusters forming an interrupted brown, more or less bracteate spike, 15-30 mm. long; sepals bristle-pointed, scarcely as long as the short-pointed capsule; seeds not appendaged. Mt. Arrowsmith, V. I., Rockies; Alaska.

5. *L. campestris* (L.) DC. Tufted, more or less villous, especially at base of leaves; 1-4 dm. high; inflorescence sub-umbellate with unequal branches, or congested; spikes cylindrical or globose; sepals longer than, or equaling, the capsule; seeds with a white appendage at base. Varying in color and length of perianth, and in length of peduncles and filaments (*L. comosa*) common, temperate, N. A.

JUNCUS (Rush)

Grass-like herbs, with or without leaves; flowers small, regular, liliaceous in structure, sepals and petals 3, glumaceous, stamens 6, sometimes 3, style short, with filiform stigmas; ovary 1-3 celled. The leaf sheaths are often auricled at apex. (Latin *jungere*, to bind).

Inflorescence lateral, springing from the side of the stem; flowers solitary, not in heads.

Flowers 1-3, plants alpine, seeds caudate.

Upper sheaths leaf-bearing, capsule acute 1. *J. Parryi*.

Stems leafless, capsule retuse 2. *J. subtriflorus*.

Flowers several to many, seeds not caudate.

Stamens 3, plants densely tufted, flowers 2 mm. long 3. *J. effusus*.

Stamens 6, stems rather in lines from rootstocks.

Flowers greenish, springing from about the middle of the stem, 2-4 mm. long. 4. *J. filiformis*.

Flowers brown, from above the middle of the stem, 3-5 mm. long.

Basal sheaths black, seeds hardly apiculate 5. *J. Lescurii*.

Basal sheaths brown, seeds apiculate 6. *J. Balticus*.

Inflorescence terminal.

Leaves knotted with distinct cross-partitions.

Leaves flat, equitant.

Leaves 2 mm. wide, inflorescence a dense head 7. *J. Mertensianus*.

Leaves wider, heads more than one, paniced.

Heads pale, stamens 6 8. *J. oxymeris*.

Heads dark, stamens 3 9. *J. ensifolius*.

Leaves terete or only slightly compressed.

Stamens 3.

Spring leaves filiform, floating 10. *J. supiniformis*.

Leaves not filiform.

Heads many, top-shaped, filaments a little longer than anthers 11. *J. acuminatus*.

Heads 2-3, subglobose, filaments several times longer than the anthers 12. *J. Bolanderi*.

Stamens 6.

Sepals and capsule obtuse, often macronate 13. *J. Alpinus*.

Sepals acute, capsule subulate.

Flowers 3-4 mm. long, petals equaling or exceeding the sepals 14. *J. nodosus*.

Flowers 4-5 mm. long, petals much shorter than the sepals 15. *J. Torreyi*.

Sepals acute, capsule not subulate.

Capsule about equaling the perianth 16. *J. nevadensis*.

Capsule much longer than the perianth 17. *J. oreganus*.

Leaves not knotted, flat or terete.

Flowers solitary or in loose or dense panicles, bracteolate, not in true heads, leaves not hollow.

Stem branching, leafy annuals 18. *J. bufonius*.

Stem simple, perennials.

Perianth-segments acuminate, exceeding the capsule, leaves basal.

Inflorescence greenish, usually open 19. *J. tenuis*.

Inflorescence fuscous, usually congested 20. *J. occidentalis*.

Perianth-segments obtuse, about equaling the capsule, stem leafy 21. *J. Gerardi*.

Flowers in true heads, not bracteolate.

Seeds caudate, leaves hollow.

Perianth-segments 5-6 mm. long, capsule much longer. 22. *J. castaneus*.

Perianth-segments 4 mm. long, capsule about as long 23. *J. triglumis*.

Seeds, not caudate, leaves flat, grass-like.

Perianth-segments smooth 24. *J. longistylis*.

Perianth-segments minutely roughened.

Perianth-segments and capsule acute 25. *J. orthophyllus*.

At least petals obtuse, capsule obtuse.

Capsule shorter than sepals 26. *J. falcatus*.

Capsule longer than sepals. 27. *J. Covillei*.

1. *J. Parryi* Engelm. Tufted, 1-4 dm. high; flowers 1-3, sepals 5-7 mm. long, bristle-pointed, longer than the petals, all linear-lanceolate, light-brown; anthers 2-3 times longer than the filaments; capsule longer than the perianth. Mts., Rockies to V. I.

2. *J. subtriflorus* Coville. Tufted, 3-5 dm. high, flowers usually 3; sepals and petals more broadly lanceolate, often bristle-pointed, with green

backs and brown margins, 5-7 mm. long; anthers twice as long as the filaments; capsule about equaling the sepals, (*J. Drummondii*). Mts; Rockies to Coast, Alaska.

3. *J. effusus* L. (COMMON RUSH). Stems soft, 3-6 dm. high; inflorescence rather open, 2-4 cm. long; flowers greenish brown, perianth-segments acuminate, about as long as the retuse, angled, greenish brown capsule, anthers as long as the filaments; seeds small, reticulated, with short, pale points. Marshy ground, common. Var. *brunneus* Engelm. Inflorescence very dense, about 1.5 cm. long. With species, V.I.; Vancouver. Var. *gracilis* Hook. More slender, with a smaller panicle. Sidney, V. I.

4. *J. filiformis* L. Scape very slender, 1-5 dm. high; sheaths brown-purple, bristle tipped; panicle small, few-flowered; sepals lanceolate, petals slightly shorter, less acute, rather longer than the obtuse greenish capsule; anthers shorter than the filaments; seeds short-pointed at both ends, obscurely reticulated. Atlantic to Pacific; Coast Mts.; Kamloops; Alaska.

5. *J. Lescurii* Bol. Distinguished from *J. Balticus* by the intramarginal brown stripes of the perianth-segments, and by the seeds which are lighter in color, ovoid, hardly pointed. Salt marshes and sands along the Coast, V. I.; Alaska.

6. *J. Balticus* Willd. Scapes 3-10 dm. high, more slender and rigid than in *J. effusus*, inflorescence smaller, open or rather dense, and flowers larger; sepals more acute than the petals, anthers much longer than the filaments, capsule obtuse, mucronate; seeds reticulate, hardly pointed, rather large, not pale pointed. Common.

7. *J. Mertensianus* Bong. Stems slender, 1.5-3.5 dm. high, leaf sheaths auricled; head about 1 cm. in diameter, usually solitary; perianth-segments lanceolate, the sepals bristle-tipped, a little longer than the obtuse, obovate, mucronate capsule; seeds apiculate at both ends. Mts; Alaska to California.

8. *J. oxymetris* Engelm. Tufted, stems stout, 6-12 dm. high; leaves 4-8 mm. wide; panicle decompound, 1-2.5 dm. long, heads rather small, numerous, 3-12 flowered; perianth-segments pale or reddish, linear-lanceolate, acuminate, 4-5 mm. long; anthers 6, twice as long as the filaments; capsule lanceolate, about equaling the perianth; seeds yellow, acute at apex, reticulated. Salt marshes, West Coast, V. I.; New Westminster.

9. *J. ensifolius* Wiks. Stems leafy, 2-5 dm. high; leaves 4-8 mm. wide, heads 2—several, paniced, dark brown or nearly black, globose, perianth-segments acuminate, subequal, about equaling the obtuse, mucronate, 3-angled capsule; seeds reddish-yellow, acute at both ends, reticulated. (*J. Ziphoides*) V. I. to Rockies; Alaska, Vancouver. Var. *Major* Hook. Heads many, brown; same range.

10. *J. supiniformis* Engelm. Spring leaves very slender, floating, withering when the water recedes; stems generally floating in water and often rooting at the nodes; when growing in mud the fruiting stems are low, more erect, with erect terete leaves and a simple panicle; heads about 5-flowered, perianth-segments lance-ovate, about 3.5 mm. long, sub-equal; stamens 3, anthers much shorter than the filaments; capsule obtuse, mucronate, 1-celled, scarcely exceeding the perianth. Ponds at mouth of Somas River; Sproat Lake. Also in Cal. but not in Wn.

11. *J. acuminatus* Michx. Stems 2-3 leaved, 3-6 dm. high; auricles 0.5-2 mm. long, heads few-30, top-shaped, 5-10 mm. broad, light brown or reddish, perianth-segments reddish, equal, narrowly lanceolate, acuminate, about as long as the short-pointed light-brown angled, 1-celled capsule; seeds acute at both ends, short-pointed at apex, plainly reticulated; stamens 3, sometimes 4 or 5, heads often proliferous in autumn. New Westminster; Atlantic to Pacific. Slender often decumbent forms with light brown or darker longer capsules may be var-*debilis* Engelm; or more probably an undescribed species. Lulu Island.

12. *J. Bolanderi* Engelm. Rather stout, 5-6 dm. high, with about 2 stem leaves, auricles 4 mm. long, heads dark brown, very many-flowered, 10-12 mm. thick, globose, mostly 2-3 and crowded; perianth-segments acuminate a little longer than the oblong-clavate, short-pointed capsule. Victoria and North West Coast.

13. *J. alpinus* var. *insignis* Fries. Stems leafy, slender, 1-5 dm. high; heads few to many, top-shaped, small in a meagre open panicle, with erect branches, greenish or straw colored, 2-2.5 mm. long, usually with 1 or more flowers elevated on slender pedicels; sepals obtuse, often mucronate, usually longer than the obtuse petals, and as long as, or shorter than, the brown capsule. Sandy lake and stream shores. V. I. eastward. Var. *furcescens* Fernald. Heads compact, none of the flowers raised, the branches of the panicle spreading, ascending. Same range. Cameron Lake, V. I.; Strathcona Park.

14. *J. nodosus* L. Slender, 1.5-6 dm. high; from a slender, tuber-bearing rootstock, mostly with 2-3 slender leaves; heads few, globose, 7-10 mm. in diameter; sepals nearly as long as the slender, triangular, taper-pointed, 1-celled capsule; anthers shorter than the filaments. Atlantic to Pacific; Spence's Bridge; Donald.

15. *J. Torreyi* Coville. Stems single, stout, 4-10 mm. high; with thick leaves often abruptly divergent, inflorescence congested, heads 1-20 spherical, 1-1.5 cm. in diameter; capsule with a beak 1 mm. long. Sask. to Wn.

16. *J. nevadensis* Wats. Resembling *J. acuminatus* but more slender, stem somewhat compressed; heads smaller; perianth-segments brownish, narrowly lanceolate, anthers longer than the filaments; capsule abruptly acute, beaked, nearly equaling the perianth; seeds acute at both ends. Eastern Wn. to coast, Lower Fraser, V. I.

17. *J. oreganus* Wats. Stems 2-4 dm. high; sheaths auricled, panicle 1-1.5 dm. long, branches erect or ascending; heads few-flowered, top-shaped, perianth-segments lanceolate, acute, reddish-brown, sub-equal, anthers equaling the filaments; capsule dark-purple, acute, seeds spindle-shaped. Cameron Lake, V. I.; Alaska.

18. *J. bufonius* L. Low, much branched, 0.5-3 dm. high; flowers remote, greenish, sometimes replaced by leafy tufts, perianth-segments linear-lanceolate exceeding the capsule, seeds acute, narrowly ellipsoidal. Roadsides, common; Alaska.

19. *J. tenuis* Willd. Stem wiry, 0.5-6 dm. high, auricles prominent; cyme 4-14 cm. long, bracts usually exceeding the inflorescence; flowers greenish, aggregated at the tips of, or scattered along, the branches; perianth-segments narrowly lanceolate with scarios margins, somewhat spreading, acuminate, longer than the greenish obtuse capsule; anthers much shorter than the filaments; seeds more or less white-tipped and unsymmetrical. Common; roadsides; Peace River.

20. *J. occidentalis* Weigand. Stems stiff, erect, 3-6 dm. high, the short auricles white, scarios; inflorescence mostly congested but sometimes more open, 1.5-3 cm. long, fuscous; perianth-segments erect, lanceolate, the inner more broadly scarios (broader too, than in *J. tenuis*); anthers much shorter than the filaments, capsule obtuse, becoming retuse, about $\frac{3}{4}$ as long as the sepals; seeds apiculate more or less white-tipped and unsymmetrical. Common about Victoria.

21. *J. Gerardi* Loisel. Stems 3-6 dm. high, leaves grass-like, nearly equaling the stem, sheaths 1-6, all blade bearing, covering half the stem; inflorescence 2-7 cm. long, open, the branches bearing 1-2 flowers at the ends; anthers much longer than the filaments; sepals 3-4 mm. long; capsule rounded, apiculate. Shores, V. I.; Burrard Inlet.

22. *J. castaneus* Smith. Stem 1-4 dm. high, more or less leafy; basal leaves 2 mm. thick, tapering from an involute tubular base to a slender channeled acutish apex, septa present but not evident; heads 1-3, few-flowered, dark; perianth-segments lanceolate, stamens nearly as long; capsule brown, acute, much longer than the sepals. Rockies and northward.

23. *J. triglumis* L. Stems 0.5-1.5 dm. high, leafy only at the base, but the uppermost leaf often with a long sheath, leaves 1mm. thick, channeled at the base; head solitary, mostly 3-flowered; perianth-segments rather obtuse, shorter than the obtuse capsule, filaments nearly as long as the sepals. Rocks and northward.

24. *J. longistylis* Torr. Stems 3-5 dm. high, stoloniferous, minutely scabrous above, heads few, 3-12 flowered, in a contracted panicle, 3-5 cm. long, perianth-segments, 5-6 mm. long; capsule ovoid, apiculate, rounded above, equaling, or a little longer than, the acuminate sepals. Rockies.

25. *J. orthophyllus* Coville. Stems 3-8 dm. high, leaves about 2mm. wide, shorter than the sheaths, with auricles; heads paniced, few-flowered; perianth-segments lanceolate, acuminate, straw-colored, 6 mm. long. Kok-salah, V. I. also in eastern Wn. (*J. latifolius* Buch.)

26. *J. falcatus* Meyer. Stems leafy below, 2-3 dm. high; leaves 2-3 mm. wide, often equaling the stem, leaf sheaths not auricled; bract short; heads 1 or 2, 9-14 mm. broad, 2-12-flowered; perianth-segments 4-5 mm. long, brown with a green back; scarious-margined, subequal, sepals acute, petals obtusish, capsule obtuse or retuse; anthers about equaling the filaments; seeds large, ovoid, dark brown, clearly reticulated. Q. Charlotte Is., southward.

27. *J. Covillei* Piper. Similar; heads 2-many, paniced, all peduncled but the lowest, 3-10-flowered; sepals acute or obtusish, petals very obtuse, rather shorter. Along stony margins of streams and lakes, V. I. (*J. falcatus* var. *paniculatus*).

LILIACEÆ (LILY FAMILY)

Herbs with regular, symmetrical usually 6-androus flowers; the perianth not glumaceous, free from the 3-celled, superior ovary, the stamens opposite its lobes or divisions; petals and sepals both colored, except in *Trillium* and *Calochortus*. The leaves are broad or narrow and grass-like, and parallel-veined. The following 3 sections are often treated as separate-Families.

Fruit a berry Sec. I. CONVALLARIACEÆ.

Fruit a capsule Sec. II. MELANTHACEÆ.

Styles distinct to the base; fruit septicidal Sec. II. MELANTHACEÆ.
Styles more or less united; fruit loculicidal (except calochortus) Sec. III. LILIACEÆ.

Sec I.—CONVALLARIACEÆ

From rootstocks; leaves broad (except in *Asparagus*), flowers solitary, in small umbels or racemes, or many in *Smilacina*; perianth-segments distinct or partly united; styles usually united.

- | | |
|---|-------------------------|
| True leaves scale-like, the seeming leaves filiform | 1. <i>Asparagus</i> . |
| Leaves foliaceous. | |
| Leaves in a whorl of 3 at the top of the stem | 2. <i>Trillium</i> . |
| Leaves, not whorled. | |
| Leaves all basal, flower 1 | 3. <i>Clintonia</i> . |
| Leaves not all basal, flowers axillary or paniced. | |
| Perianth 4-parted, flowers in a raceme | 4. <i>Maianthemum</i> . |
| Perianth 6-parted. | |
| Flowers in a terminal raceme or panicle | 5. <i>Smilacina</i> . |
| Flowers few in terminal umbels | 6. <i>Disporum</i> . |
| Flowers axillary, solitary or in pairs | 7. <i>Streptopus</i> . |

Sec. II.—MELANTHACEÆ

Perennial from rootstocks or bulbs; leaves narrow (except in *Veratrum*), flowers mostly rather small, (1 cm. long or less) in racemes or panicles; perianth-segments distinct or nearly so; fruit usually septicidal; seeds often winged or tailed.

- | | |
|---|--------------------------|
| Leaves large and wide | 8. <i>Veratrum</i> . |
| Leaves long and narrow. | |
| Leaves serrulate or rough-margined | 9. <i>Xerophyllum</i> . |
| Leaves entire, not rough-margined. | |
| Stems from rootstocks | 10. <i>Tofieldia</i> . |
| Stems from bulbs. | |
| Sepals with 1-2 glandular spots at base | 11. <i>Zygadenus</i> . |
| Sepals not glandular, acuminate | 12. <i>Stenanthium</i> . |

Sec. III.—LILIACEÆ

From bulbs, leaves various, flowers mostly more than 1 cm. long, the perianth-segments distinct or nearly so, or somewhat united, into a tube, fruit a locuticidal capsule (except in *calochortus*), seeds winged or wingless.

- Outer perianth-segments smaller, greenish, style wanting 13. *Calochortus*.
 Perianth-segments similar, all colored alike, style present.
 Leaves 2, broad, apparently basal 14. *Erythronium*.
 Leaves more than 2.
 Flowers with scarious bracts.
 Inflorescence racemose, flowers blue 15. *Camassia*.
 Inflorescence an umbel.
 Perianth-segments united for at least $\frac{1}{4}$ of their length 16. *Brodiaea*.
 Perianth-segments not united 17. *Allium*.
 Flowers with foliaceous bracts or bractless.
 Flowers white, stem leaves short 18. *Lloydia*.
 Flowers not white, stem leaves long.
 Flowers yellow, very large; anthers versatile 19. *Lilium*.
 Flowers dark purple, or if yellow, small; anthers innate 20. *Fritillaria*.

**Key to the Genera based on characteristics of
leaves and flowers**

- True leaves scale-like; the so-called leaves filiform 1. *Asparagus*.
 Leaves not scale-like not filiform.
 Sepals decidedly narrower than the petals, green or greenish, large.
 Leaves ovate in a whorl of 3 2. *Trillium*.
 Leaves narrow 13. *Calochortus*.
 Sepals and petals alike or nearly so.
 Flowers brown or rich yellow.
 Leaves linear, grass-like.
 Flowers many in a raceme 12. *Stenanthium*.
 Flowers usually solitary 14. *Erythronium*.
 Leaves broad.
 Leaves 2, apparently basal 14. *Erythronium*.
 Leaves more than 2, not basal.
 Perianth dark brown, or if yellow about 12 mm. long 20. *Fritillaria*.
 Perianth yellow, 2.5-4 cm. long 19. *Lilium*.
 Flowers blue.
 Perianth-segments separate 15. *Camassia*.
 Perianth-segments united below 16. *Brodiaea*.
 Flowers white, creamy, greenish (or pink in species of *Erythronium*, *Streptopus* and *Allium*).
 Leaves broad.
 Perianth-segments 4 4. *Maianthemum*.
 Perianth-segments 6
 Leaves 2-3, basal or apparently so.
 Leaves glabrous, flowers 2.5-4 cm. long 14. *Erythronium*.
 Leaves pubescent, flowers 1.5-2 cm. long 3. *Clintonia*.
 Leaves many, not basal.
 Plants tall, stout; leaves 1-2 dm. broad 8. *Veratrum*.
 Plants rather slender; leaves narrower.
 Flowers in racemes or panicles 5. *Smilacina*.
 Flowers in few-flowered umbels 6. *Disporum*.
 Flowers axillary, solitary 7. *Streptopus*.
 Leaves narrow, grass-like.
 Plants with onion-like odor, flowers usually pink 17. *Allium*.
 Plants without onion-like odor, flowers white.
 Leaves serrulate 9. *Xerophyllum*.
 Leaves entire.
 Perianth-segments 2-6 mm. long, separate 10. *Tofieldia*.
 Perianth-segments 8-12 mm. long.
 Low, perianth-segments separate 18. *Lloydia*.
 Tall, perianth-segments united below 16. *Brodiaea*.

ASPARAGUS

Stems tall, much branched, with thread-like branches clustered in the axils of the small scales (the true leaves); flowers axillary, greenish-yellow, small, on jointed pedicels. (The Greek name).

1. *A. officinalis* L. (GARDEN A.) A common garden escape, especially about the irrigating ditches, Spence's Bridge etc.

2. TRILLIUM (WAKE ROBIN)

Low, from a short, thick rootstock, with a simple stem and large net-veined leaves; sepals green, petals white or pink; anthers adnate; styles 3; fruit a berry-like capsule. (*L. tres*, the parts of the flower being in 3's).

1. *T. ovatum* Pursh. About 3 dm. high; leaves rhombic-ovate, 6-16 cm. long, sessile; the solitary flower peduncled, the petals broader than the acute sepals, white changing to red. Woods, common.

3. CLINTONIA (QUEEN'S CUP)

Scapose from slender rootstocks, with 2-4 broad nearly basal leaves; perianth deciduous; stamens versatile, style long, slender, slightly 2 or 3-lobed. (Clinton was a Governor of New York).

1. *C. uniflora* Kunth. Low, 1-1.5 dm. high, villous to nearly glabrous; leaves elliptical; flowers white, 1 or sometimes 2; perianth 15-20 mm. long; berries blue. Woods V. I. to the Rockies and far northward.

4. MAIANTHEMUM (WILD LILY-OF-THE-VALLEY)

Low, from slender rootstocks, with 2 or 3 broad cauline leaves; flowers small, white; stigma 2-lobed, ovary 4-celled, stamens and perianth-segments 4. (*Mrius*, May, *anthemon*, a flower).

1. *M. bifolium* (Wood). Var. *kamtschaticum* Gmel. Glabrous, 1-3 dm. high, stem-leaves triangular-ovate, cordate, acute, 5-8 cm. broad, the radical rounder, unsymmetrical; flowers often fascicled in the raceme, style short; fruit speckled with brown, becoming dark red. Common, Coast woods; Alaska.

5. SMILACINA (FALSE SOLOMON'S SEAL)

Stems simple, scaly below, leafy above; flowers white or cream-colored, small, the perianth-segments distinct; style short, with a slightly 3-lobed stigma; berry 1-3-seeded. (Dim. of *Smilax*).

Flowers paniced, stamens slightly exserted.

Petals and sepals 2.5-4 mm. long.

Leaves slightly petioled, at least below, acuminate

Leaves all sessile, clasping, acute.

Petals and sepals 1-1.5 mm. long.

Flowers racemose, stamens included.

Leaves numerous.

Leaves acute, ciliate-margined, flat, spreading

Leaves acuminate, puberulent-margined, often folded, ascending

Leaves 2-4, usually 3.

1. *S. racemosa*.

3. *S. amplexicaulis*.

2. *S. brachypetala*.

4. *S. sessilifolia*.

5. *S. stellata*.

6. *S. trifolia*.

1. *S. racemosa* L. Usually in clumps, minutely pubescent, 4-9 dm. high; leaves elliptical to oblong-lanceolate; 10-18 cm. long; flowers very numerous, subsessile; panicle peduncled; petals and sepals equaling the stamens; filaments petaloid, style not half as long as the ovary; berries 6-8 mm. in diameter, speckled with purple, becoming red. Moist woods V. I. and across the continent.

2. *S. brachypetala* Rydb. Similar, petals and sepals oblong, scarcely half as long as the lanceolate-subulate, petaloid filaments; style about 0.5 mm. long; berry dark purple, about 6 mm. in diameter. Glacier; Deer Park; Victoria.

3. *S. amplexicaulis* Nutt. Similar to *S. racemosa*; panicle narrow, sessile or short-peduncled, filaments broadly subulate, often as wide as the perianth-segments; style nearly as long as the ovary, flowers fewer. Kootenay; Castlegar.

4. *S. sessilifolia* Nutt. Stem flexuous, 3-5 dm. high, more slender, leaves slightly puberulent beneath, spreading or ascending, distichous, hardly clasping, thin, not glaucous; lower pedicels 7-15 mm. long, raceme usually few-flowered, filaments about $\frac{1}{2}$ as long as the perianth, fruit black-lined becoming dark-red. Damp woods, west of the Cascades.

5. *S. stellata* (L.) Desf. Stem smooth, hardly flexuous, 1-4 dm. high; leaves ascending to nearly erect, clasping, smooth above, minutely pubescent beneath, often thick and glaucous, slightly clasping; flowers 6-20, the lower pedicels, 4-11 mm. long; filaments $\frac{2}{3}$ as long as the perianth; fruit green with dark lines, becoming red. Moist woods and hills, Cascades to Rockies.

6. *S. trifolia* (L.) Desf. Glabrous, 1-2 dm. high; leaves oblong-lanceolate, tapering to a sheathing base, acute; raceme few-flowered on peduncles 2.5-4.5 cm. long; berry dark red. Rockies and northward.

6. DISPORUM (FAIRY-BELLS)

Pubescent, scaly-bracted below, branching, from running rootstocks leaves sessile; flowers rather small, perianth 6-divided, stamens hypogynous, filaments thread-like; stigmas entire or 3-cleft, seeds 3-many, fruit red. (Greek, *dis*, twice, *spora*, a seed; from the 2 ovuled cells).

Stigma 3-lobed.

Berry nearly smooth, perianth segments broad at base 1. *D. Smithii*.

Berry papillose, perianth segments narrow at base 2. *D. trachycarpum*.

Stigma entire.

Leaves acuminate, stamens exserted 3. *D. oreganum*.

Leaves acute, stamens not exserted 4. *D. Hookeri*.

1. *D. Smithii* (Hook) Piper. Much branched; leaves ovate-lanceolate, acuminate, rounded or slightly cordate at base; flowers 2-5; perianth-segments 12-22 mm. long, the stamens $\frac{2}{3}$ as long; stigma slightly 3-lobed, berry oblong-ovoid, short beaked, nearly smooth except at apex, 3-6 seeded. Cowichan Lake; Nootka; Coast Range.

2. *D. trachycarpum* B & H.. Simple or with 3-5 branches; leaves ovate-oblong; acute, or acuminate, rounded or cordate at the base; flowers 1-3, perianth-segments oblanceolate, 1-1.5 cm. long, longer than pedicels, equaling the stamens; fruit globose with 3-15 whitish seeds. East of Cascades. Kamloops, etc.

3. *D. oreganum* B. & H. Much branched, 3-8 dm. high; branches very pubescent above; leaves ovate to oblong, acuminate, clasping-cordate; flowers in clusters of 2-4, the perianth-segments 12-15 mm. long, stamens exserted; pedicels woolly-pubescent; fruit ovoid or obovoid obtuse or shortly blunt-pointed, 10-12 mm. long, pubescent, 3-6 seeded. Damp woods, V. I. and Coast region.

4. *D. Hookeri* B. & H. Branching, 2-5 dm. high; leaves ovate, cordate; flowers in clusters of 1-6, the pedicels not woolly-pubescent; perianth-segments 8-12 mm. long, the stamens about as long; fruit glabrous or pubescent, beaked or obtuse, 6-seeded. Woods, Yale to Donald.

7. STREPTOPUS (TWISTED-STALK)

Glabrous, simple or branched, leaves sessile; pedicels curving or geniculate; perianth 6-divided, the stamens inserted on the base of the segments; anthers sagittate, basifixed; stigma 3-lobed or entire; fruit many-seeded.

Corolla rotate, rose-colored 1. *S. streptopoides*

Corolla campanulate.

Leaves glaucous beneath, corolla greenish-white 2. *S. amplexifolius*.

Leaves not glaucous, corolla rose 3. *S. roseus*.

1. *S. streptopoides* (Led) F. and R. Slender, simple, 1-2 dm. high; leaves ovate, acute, 3-5 cm. long, not clasping nor ciliate, flowers solitary in the upper axils on curving pedicels about 1 cm. long; perianth-segments 2.5 mm. long, triangular ovate, recurving. (*Smilacina brevipes* Baker) Cascade Mts.

2. *S. amplexifolius* DC. Stout, 3-9 dm. high, dichotomously branching, leaves ovate-lanceolate, acuminate, strongly clasping; pedicels geniculate; flowers 8-10 mm. long, the segments recurving; stigma entire, fruit ellipsoid, red or yellow. Woods, common; Alaska to Wn.

3. **S. roseus** Mich. Usually simple, 1-4 dm. high; leaves ovate-lanceolate, acuminate, scabrous, ciliate-margined, not clasping; pedicels curving, 1-1.5 cm. long, flowers 6-10 mm. long, the perianth-segments spreading, stigma 3-lobed; fruit globose, smaller, red. (*S. curvipes* Vail) Cold woods, across the continent; Alaska.

8. VERATRUM (FALSE HELLEBORE)

Tall and stout with coarse, fibrous, poisonous roots; leaves strongly nerved; flowers polygamous in a large panicle; perianth-segments greenish; stamens hypogynous, included; seeds flat, winged. (*L. vere*, truly, *ater*, black, in allusion to the seeds).

1. **V. viride** Ait. Pubescent above, 6-20 dm. high, leaves oval, often 1 dm. or more wide. Nanaimo; mt. valleys.

9. XEROPHYLLUM (BEAR GRASS)

Tall with numerous long, tough, rigid leaves, and many small, perfect flowers in a terminal raceme; stamens on the base of the perianth-segments; capsule usually loculicidal; seeds oblong. (Greek, *xeros*, dry, *phyllon*, a leaf).

1. **X. tenax** Nutt. Rootstock stout; plant 3-6 dm. high; lower leaves 3-5 dm. long; raceme elongated, the pedicels 2-3 cm. long; perianth-segments 8-10 mm. long, white. S. Kootenay Pass.

10. TOFIELDIA (FALSE ASPHODEL)

Slender, often tufted, with narrow basal leaves and whitish flowers in a terminal raceme; just below the calyx is a small 3-bracted involucre; stamens on the bases of the persistent perianth-segments, anthers round-cordate or peltate, 2-celled; styles short, seeds often tailed. (Tofield was an English botanist).

Stems not glandular above, seeds not tailed 1. *T. palustris*

Stems glandular above, seeds tailed.

Sepals and petals 4 mm. long, capsule ovoid 2. *T. intermedia*.

Sepals and petals 6 mm. long, capsule obovoid 3. *T. occidentalis*.

1. **T. palustris** Huds. Stem slender, 0.5-2 dm. high, bearing a globose or short-cylindrical spike of very small greenish-white flowers; pedicels solitary; leaves 2-4 cm. long; tufted, 3-nerved beneath. Rockies and northward.

2. **T. intermedia** Rydb. Stem viscid-puberulent above, with black glands, 1.5-4 dm. high; leaves 5 cm. long or more; racemes globose to short-cylindrical, the pedicels in 2's or 3's, 5 mm. long or less, the involucre bracts united for $\frac{2}{3}$ their length. Lake shores and mt. marshes. Common, Alaska to Oregon.

3. **T. occidentalis** Wats. Similar; taller; raceme 2.5-5 cm. long, more open; pedicels and perianth-segments nearly twice as long; involucre bracts united to the middle. Selkirks.

11. ZYGADENUS (ZYGADENE)

Stem leafy, leaves long, narrow; flowers small, whitish, perfect or polygamous in a terminal raceme or panicle; stamens hypogynous, about equaling the obtuse or acute perianth-segments; anthers cordate or peltate, 1-celled, seeds angled. (Greek, *zygos*, a yoke, *adenos*, a gland; the perianth-segments of some species have 2 glands).

Petals 8-11 mm. long; lower bracts foliaceous 1. *Z. chloranthus*.

Petals 2-7 mm. long; bracts scarious.

Inflorescence paniced, petals acute, 2-4 mm. long 2. *Z. paniculatus*.

Raceme simple, petals obtuse, 4-7 mm. long 3. *Z. venenosus*.

1. **Z. chloranthus** Rich. Stems 2-9 dm. high; leaves 4-12 mm. wide; raceme usually compound, flowers mostly perfect; perianth-segments coherent with the base of the ovary, obtuse; gland obcordate. (*Z. elegans*). Golden; Alaska.

2. **Z. paniculatus** Wats. Stems 3-6 dm. high; leaves sheathing, roughish, gland not definitely margined; capsule 12-24 mm. long. Alberta to Wn.

3. **Z. venenosus** Wats. Stems 2-7 dm. high; leaves 4-8 mm. wide, roughish, the cauline not sheathing; gland well-defined; capsule 8-12 mm. long. V. I. to Rockies; common in open grassy places; Victoria, Summerland.

12. STENANTHIUM

Glabrous; flowers nodding, polygamous, in a terminal usually simple raceme; perianth-segments greenish, yellowish or purplish, persistent, stamens included, inserted on their bases; anthers peltate, 1-celled; styles long; seeds winged. (Greek *stenos*, narrow, *anthos*, a flower).

1. **S. occidentalis** (Gray) Rydb. (MOUNTAIN BELLS). Stems slender, 3-6 dm. high, from a small bulb; leaves narrowly lanceolate; flowers 12-15 mm. long. Cascades; Rockies.

13. CALOCHORTUS

Stems simple or branched from coated corms, with one narrow basal leaf; sepals lanceolate; petals large, cuneate-obovate, usually with a glandular pit above the base; sepals narrow, greenish; stamens on the perianth-segments, included; ovary usually septical. (Greek *kalos*, beautiful, *chortos*, grass; in allusion to the leaves).

Petals pink or purple, capsule erect	1. <i>C. macrocarpus</i> .
Petals white with a purple spot at base, capsule nodding	2. <i>C. elegans</i> .
Petals pale yellow, capsule nodding	3. <i>C. apiculatus</i> .

1. **C. macrocarpus** Dougl. (MARIPOSA LILY). Stem stout and rigid, 3-4 dm. high; 1-few-flowered; basal leaf long, deeply channelled; sepals purplish-green, broadly scarious-margined; petals abruptly short-acuminate, usually purplish or lavender, sometimes pink, about 4 cm. long, the upper surface hairy on the lower half above the hairy gland; capsule erect. Dry plains, interior.

2. **C. elegans** Pursh. (THREE-SPOT). Stems flexuous, 1-2.5 dm. high, 1-4-flowered; bracts 2-3 cm. long, the leaf nearly equaling the stem; sepals greenish, lance-ovate; petals obovate, obtuse, 2 cm. long, greenish-white or creamy, often greenish or purplish without, clothed with yellow hairs on the lower half within; anthers beaked; pod broadly winged, 2.5-3 cm. long, acute at both ends. Crow's Nest Pass to Creston.

3. **C. apiculatus** Baker. Stout, 3-4 dm. high; bracts 2.5-7 cm. long; sepals lanceolate, greenish white; petals obovate, 2 cm. long, sparsely hairy above inside; the distinct basal pit densely hairy without a scale, anthers acuminate; capsule nodding. To be looked for on the Idaho Boundary.

14. ERYTHRONIUM (DOG TOOTH VIOLET)

Leaves 2, about the middle of the stem which rises from a deep corm; flowers large with finally recurving perianth-segments the 3 inner rather narrower and usually with a basal crown of scales or auricles; stamens hypogynous, style 3-lobed; pod large, tapering to the base, seeds large, many (Greek *erythros*, red, in allusion to the red flowers of some species. The common name alludes either to the long perianth-segments, or to the rows of white seeds).

Inner perianth-segments with a basal crown.

- | | |
|------------------------------|--|
| Flowers yellow | 1. <i>E. grandiflorum</i> . |
| Flowers white. | |
| Leaves mottled | 1. a. <i>E. grandiflorum</i>
var. <i>albiflorum</i> . |
| Leaves not mottled | 2. <i>E. montanum</i> . |
| Flowers pink | 1. b. <i>E. grandiflorum</i>
var. <i>Smithii</i> . |

Inner perianth-segments without a basal crown, flowers white to straw-colored

3. *E. Howellii*.

1. *E. grandiflorum* Pursh. Stout, 3-6 dm. high; leaves broadly lanceolate or nearly elliptical, not mottled, sometimes glaucous, one of them usually more acute than the other; flowers 2-6, sometimes solitary; perianth-segments 3.5-6 cm. long, the inner slightly narrower, bright yellow, slightly paler at base within; anthers yellow or purple; style clavate, the stigmas at length recurved. Cascades to Rockies. Var. *parviflorum* Wats. Leaves oblong-lanceolate; flowers smaller, the perianth-segments 2.5-3 cm. long. Mts. V. I.; Cascade Mts. to Rockies.

1a. *E. grandiflorum* Var. *albiflorum* Hook. Stem 2-4 dm. high, 1- or sometimes 2-flowered; leaves rarely more than 2, broadly lanceolate, one of them usually more acute than the other, mottled whitish or brownish; perianth-segments 5-6 or usually 8-12 mm. broad, 3.5-5 cm. long, the outer rather broader and more acuminate, all white with more or less distinct purple markings towards the yellowish base, sometimes pink or fading pink; anthers 6-10 mm. long; the filaments broadening towards the base; style clavate, the stigmas at length recurving to touch the anthers. (*E. gigantum* Lindl.) West of the Cascades. Var. *Smithii* (Hook.) Rather smaller; perianth-segments 5-8 mm. wide, pink. Comox; Ucluelet.

2. *E. montanum* Wats. Similar; leaves pale-green, not mottled; flowers 1-5, segments of perianth 2.5-4 cm. in length, white with an orange base, often turning pinkish in age, style much exceeding the stamens; filaments slender. Grand Central Lake, V. I.

3. *E. Howellii* Wats. Rather slender 1.5-4 dm. high, 1-3-flowered; leaves oblong-lanceolate 2.5 cm. wide or less, mottled; perianth-segments 3.5 cm. long, straw colored to white with orange base; anthers white, the filaments very slender; style slightly clavate, stigma faintly 3-lobed. Barclay Sound; Cowichan Lake.

15. CAMASSIA (CAMAS)

Scapose from rather large coated bulbs; leaves long and narrow; flowers in a small to ample terminal raceme, the perianth-segments blue, widely spreading, 3-9 nerved; stamens on the base of the perianth, anthers versatile, stigma 3-lobed; capsule sessile, with many black ovoid seeds. (The Indian name).

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|---|----------------------------|
| Perianth-segments symmetrically arranged, tightly twisting about the fruiting pod | 1. <i>C. Leichtlinii</i> . |
| Perianth-segments unsymmetrically arranged, not connivent about the pod | 2. <i>C. quamash</i> . |

1. *C. Leichtlinii* Wats. Stout, 2-6 dm. high; leaves usually glaucous above; perianth-segments 2-2.5 cm. long, 6-8 broad, the petals rather broader than the sepals, usually 7-nerved, dark blue, or rarely white, in withering tightly twisted about the pod; stigma lobes short and broad, not very evident; pod more or less angled at top, narrowed at base, seeds dull-black ovoid, 1.2-2.5 cm. long, capsule conspicuously cross-veined. Grassy bluffs and meadows, V. I.; Chilliwack. A white variety occurs near Victoria. Mr. J. M. Macoun informs me that *C. Suksdorfii* Greenm., perianth-segments usually 5-veined, capsules not conspicuously veined, occurs at Sidney, V. I.

2. *C. quamash* Greene. Similar, not so tall and stout and usually with fewer flowers, leaves usually glaucous above; one of the perianth-segments standing by itself, making angles of 90° with its neighbors; petals 4-7 mm.

wide, slightly broader than the sepals, all light blue or darker, not connivent in withering; stigmas evident, linear; pod obtusely angled at top, rounded at base, 0.8-2 cm. long, seeds black, shining, lance-ovoid. With the former, flowering earlier, V. 1.

16. BRODIEÆ (WILD HYACINTH)

Stems scapose from corms coated with a fibrous membrane, leaves grass-like, usually withering before anthesis; flowers usually in an umbel, sometimes solitary, perianth campanulate to funnel-form, the segments 1-nerved; stamens 6, or the outer 3 replaced by staminodia, about equaling the 3-lobed style; seeds angled, black. (Brodie was a Scotch botanist).

Flowers white	1. <i>B. lactea</i> .
Flowers purple or blue.	
Stamens 3, in 1 row, staminodia 3, anthers innate	2. <i>B. grandiflora</i> .
Stamens 6, in 2 rows, anthers versatile	3. <i>B. Douglasii</i> .

1. *B. lactea* Wats. (FOOL'S ONION). Scapes 3-8 dm. high; leaves 5 mm. wide; pedicels 2-3 cm. long; perianth about 1 cm. long, its lobes much longer than the tube, anthers short, versatile, with deltoid filaments; capsule globose on a stipe 3 mm. long. Grassy places Victoria and D. I.

2. *B. grandiflora* Smith. Scape 1-3 dm. high, with 1-6 flowers, leaves 2 mm. broad; perianth dark-purple to rose, 2-3 cm. long, the lobes somewhat longer than the tube; staminodia whitish, anthers innate; capsule oblong subsessile. V. I. and grassy cliffs near the coast.

3. *B. Douglasii* Wats. (WILD HYACINTH). Scape 2-6 dm. high; flowers about 2.5 cm. long, blue-purple; the perianth lobes much shorter than the tube; stamens in 2 rows with versatile anthers, the filaments of the upper very broad at base; capsule oblong-obvoid on a stipe about as long. D. I.; Similkameen etc.; Victoria.

17. ALLIUM (ONION)

Scapose from coated bulbs, and having the characteristic onion odor; flowers in a terminal umbel, rose-color to white, the segments somewhat spreading, 1-nerved, often becoming dry and scarious; anthers versatile with thread-like filaments usually dilated at the base; style filiform; stigma simple or slightly 3-lobed; seeds black, 1-2 in each cell. The flowers are sometimes replaced by bulblets. (The Latin name).

Scapae terete or nearly so.

Bulbs fibrous-coated.

Petals and sepals about 5 mm. long 1. *A. reticulatum*.

Petals and sepals 6-8 mm. long 2. *A. Geyeri*.

Bulbs membranous-coated.

Pedicels shorter than the petals, leaves terete 3. *A. Schœnoprasum*.

Pedicels longer than the petals, leaves not terete

Bulbs oblong or long-ovoid, not reticulated.

Umbel nodding 4. *A. cernuum*.

Umbel erect 5. *A. stellatum*.

Bulb globose, reticulated, umbels erect, petals 10-13 mm. long 6. *A. acuminatum*.

Scapae flat, winged 7. *A. vancouverense*.

1. *A. reticulatum* Fraser. Scapes 1-2 dm. high, bulbs rather large, globose; the outer coat very fibrous; leaves narrow, channeled; flowers white or pinkish on slender pedicels 4-12 mm. long, perianth thin; stamens about equaling the petals, capsule crested. Dry gravelly soil, Sask. to Idaho.

2. *A. Geyeri* Wats. Similar, taller, 1.5-6 dm. high; the perianth-segments strongly nerved and rigid in fruit; pedicels 10-15 mm. long; flowers 1-many, often replaced by pink-tinged bulblets; stamens a little shorter than the petals. Rocks near the sea, Victoria; South Kootenay.

3. *A. Schœnoprasum* L. Var. *Sibiricum* (L.) Hartus. Scape 2-4 dm. high, bearing a capitate umbel of rose-purple flowers, bulbs oblong; leaves terete, hollow; perianth-segments about 1 cm. long; capsule not crested. Wet meadows, Donald, and far northward. Chives is a form of this.

4. **A. cernuum** Roth. Scape slightly angular, 2-6 dm. high; bulbs long, usually clustered, from a short rootstock; leaves flat at apex, concave-convex below, often keeled; perianth-segments ovate-oblong, bluntish, 5-6 mm. long, pink; stamens exserted, capsule crested. April to midsummer. Common.

5. **A. stellatum** Ker. Similar to *A. cernuum*; scape more slender and less ridged, with an erect umbel; leaves flat; capsule more prominently crested. Spence's Bridge; Rockies.

6. **A. acuminatum** Hook. Scapes 1.5-3.5 dm. high; leaves 2-3; withered at flowering; the outer coats of the globose bulb with a distinct hexagonal or quadrilateral reticulation; bracts of spathe strongly nerved, long-pointed; pedicels 12-25 mm. long, (umbel few-many-flowered, perianth-segments 10-13 mm. long, the inner crisp-serrulate, rose-purple, lanceolate, $\frac{1}{2}$ longer than the stamens; the tips recurving, keeled at base, rigid; capsule obscurely crested; bulb reticulated. V. I. to Rockies. June-July).

7. **A. vancouverense** Macoun. Said to resemble *A. falcifolium*, which has a stout, flat, prominently winged scape, about 1 dm. high, equaling the leaves. Mt. Arrowsmith, V. I.

18. LLOYDIA

Low, from a small bulb; stems simple with a few short linear leaves, much shorter than the linear basal ones; flower usually solitary, stamens on the base of the 3-lined white perianth-segments; anthers innate short; capsule globose, 3-angled, seeds reddish. (Lloyd was an English naturalist).

1. **L. serotina** Reich. Slender 1-1.5 dm. high; perianth-segments persistent, finally deflexed, about 1 cm. long. Mts. and Arctic regions.

19. LILIUM (LILY)

Stems simple, leafy, from a scaly bulb; leaves scattered or whorled; stamens hypogynous, included; style longer than the stamens, the stigma slightly 3-lobed; seeds many, flat, in 2 rows in each cell. (The Latin name).

1. **L. montanum** A. Nels. (MOUNTAIN L.) Stem 4-6 dm. high; leaves linear-lanceolate, usually whorled above; flowers erect, 1-3, yellow, more or less purplish-spotted within, greenish-tinged without; perianth-segments with long narrow claws; pedicels shorter than the flowers. Columbia Valley eastward. (*L. philadelphicum* in part).

2. **L. parviflorum** (Hook) Holtz. (WILD TIGER L.) Stems 4-9 dm. high; leaves broadly lanceolate, mostly whorled, flowers nodding, often many, yellow, plentifully spotted with purple within; the perianth-segments narrowed to a broad base; pedicels longer than the flowers. (*L. columbianum*). V. I. to Kootenay.

20. FRITILLARIA (FRITILLARY)

Stems simple, leafy, the leaves whorled or scattered, broad or linear: flowers rather large, with foliaceous bracts; stamens hypogynous included, anthers versatile, styles long lobed or cleft. (*L. fritillus*, a dice-box, in allusion to the spotted petals of some species).

Flowers dark brown, style cleft to the middle.

Corolla mottled, the inner surface smooth

Corolla hardly mottled, the inner surface lamellate

Flowers yellow, stigma lobed.

1. *F. lanceolata*.

2. *F. kamschatcensis*.

3. *F. pudica*.

1. **F. lanceolata** Pursh. (RICE ROOT). From a large scaly bulb, 2-6 dm. high; leaves lanceolate, usually in a whorl near the middle of the stem; flowers solitary, 1-many in the axils of leaf-like bracts, perianth-segments about 2.5 cm. long, arched, the convex side outward, dark purplish brown or tinged with green, mottled with yellow, (rarely white), stamens half as long pedicels recurving; pod wing-angled. Flowering in April. Open bluffs and copses, V. I.; Lytton.

2. **F. kamtschaticensis** Ker. Stem simple, 4-6 dm. high, from a scaly bulb, leaves broadly lanceolate, bluntish, in whorls of 4-5; flowers, campanulate, 1-several, somewhat clustered; perianth-segments about 2 cm. long, the concave side outwards; the stamens less than half as long; pod obtusely angled. Flowering in May; copses near the Coast; Alaska to Wn. Var. **angustifolia**. Leaves 1 cm. wide or less. Q. Charlotte Is., Metlakahtla.

3. **F. pudica** Spreng. (MISSION BELL). Bulb small; stem slender, 1-2 dm. high; with a pair of linear leaves about the middle; flower solitary, nodding, on a long peduncle from a leafy bract, yellow, often with a brownish ring at base, or sometimes light brown without; capsule obtusely angled. Staminate flowers are not rare. Plains, Lytton; Kamloops; Vernon.

IRIDACEÆ (IRIS FAMILY)

Herbs with equitant, grass-like leaves and flat or terete stems; flowers regular 3-merous from a pair of spathes or bracts; stamens 3, separate or monodelphous; ovary inferior, 3-celled.

Stigmas petal-like; flowers 5 cm. long : : : : : 1. Iris.
Stigmas filiform, flowers much smaller : : : : : 2. Sisyrinchium.

1. IRIS (FLEUR-DE-LIS, FLAG)

Perennial, stems terete; the perianth tube prolonged above the ovary; the 3 stamens under the 3 over-arching style branches; style connate below with the perianth; capsule oblong. (Gr. *iris*, the rainbow).

1. **I. missouriensis** Nutt. Tufted, 2-6 dm. high; leaves mostly basal, 5 mm. broad, shorter than the stem, the bracts mostly scarious; flowers 1-2 pale blue; the perianth 5-7 cm. long; capsules 2-3 cm. long. Whidby Island to Yakima, Washington. Attributed to B. C. by Piper. **I. versicolor** L. Stems leafy, leaves 1 cm. wide or more, is introduced at Ucluelet.

2. SISYRINCHIUM (BLUE-EYED GRASS)

Low slender perennials usually with flat, winged stems; leaves narrow grass-like; perianth spreading. Stamens alternate with the stigmas; pod and seeds globose.

Flowers yellow, filaments free nearly to base. (Hydastylus).

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|---|------------------------|
| Capsule ellipsoidal | 1. S. boreale. |
| Capsule globose | 2. S. brachypus. |
| Flowers pale or white, the perianth 4-7 mm. long | 4. S. septentrionalis. |
| Flowers blue or purple, larger. | |
| Filaments united slightly at base, the perianth-segments 16-22 mm. long | 3. S. grandiflorum. |
| Filaments united into a tube. | |
| Perianth-segments 18-22 mm. long | 5. S. Macounii. |
| Perianth-segments shorter. | |
| The inner bract of the spathe mostly much more than half as long as the outer; perianth 12-18 mm. long. | |
| Stems branching or strongly geniculate above | 7. S. birameum. |
| Stems simple. | |
| Perianth-segments 12-18 mm. long, pod 4-6 mm. high | 6. S. idahoense. |
| Perianth-segments 12-14 mm. long, pod 6-8 mm. high | 8. S. littorale. |
| The inner bract of the spathe about half as long as the outer, or shorter; perianth 10-12 mm. long. | |
| Stems 1-1.5 mm. wide | 9. S. angustifolium. |
| Stems 2-2.5 mm. wide | 10. S. montanum |

1. **S. boreale** (Bickn). Often turning dark in drying; scapes broadly winged, 1-2.5 dm. high; bracts equal; leaves slightly scarious-margined below, 1-3 mm. wide; perianth-segments 8-10 mm. long; pedicels exerted; pod oblong-ellipsoidal, seeds often reddish. (*Hydastylus borealis* Bickn.) Shores Shawnigan Lake.

2. **S. brachypus** (Bickn). Very similar and but seemingly distinct. Leaves broader, perianth-segments longer; capsule globose, seeds black; pedicels hardly exerted, 10-15 mm. long; Cameron Lake, Ucluelet. Spec. from Ucluelet have unequal bracts and may represent a distinct form.

3. *S. grandiflorum* Dougl. Tufted or solitary; scapes not winged, 1-4 dm. high, leafy at base; leaves scarious-margined; bracts very unequal, the outer 4-8 cm. long; perianth-segments 6-8 mm. wide; of a rich purple red. Grassy places, Victoria; the only species flowering in early spring.

4. *S. septentrionalis* Bickn. Pale, glaucous, tufted, 1-2.5 dm. high; leaves stiffly erect, 0.5-1 mm. wide; the outer bract nearly twice as long as the inner; flowers small, pale blue or white on erect pedicels; perianth-segments, acuminate and short aristate, not retuse. Valley of Kicking Horse River.

5. *S. Macounii* Bickn. In narrow tufts, becoming 5 dm. high; green and glaucescent; leaves 1.5-3 mm. wide, the stem 1-1.5 mm. wide, sometimes bearing a leaf near the top. The inner bract about half as long as the outer, or shorter, flowers 2-4, the pedicels becoming 3.5 cm. long; flowers deep purple with a very small yellow eye. Comox.

6. *S. idahoense* Bickn. Usually discolored in drying; mostly tufted, pale green or glaucous, 1.5-4 dm. high; stems very narrowly winged; simple or rarely with 2 peduncles above; leaves $\frac{1}{2}$ - $\frac{3}{4}$ as long; 1-3.5 mm. broad, (usually broad at the coast); bracts rather broad, the outer bract 3-6 cm. long, the inner only exceptionally half as long; flowers 1-6, deep blue; pod becoming dark. The common coast species, Vancouver Island to the Rockies.

7. *S. birameum* Piper. In small tufts or solitary 4-5 dm., becoming dark in drying; leaves 2-3 mm. broad; a cauline leaf often present; perianth-segments 12-15 mm. long. A taller form of *S. idahoense* and not altogether distinct from that species as defined above. Shores of Cameron Lake, where the stems either have 2 peduncles, or are very strongly geniculate just below the spathe; also at Ucluelet.

8. *S. littorale* Greene. Similar to *S. idahoense*, but not tufted, with thinner and broader leaves and stems; smaller flowers and larger fruit; stout 15-35 cm. tall; leaves 2-4 mm. wide; stems stout, prominently winged; capsules thick-walled. An Alaskan species, found also at Oak Bay, Victoria.

9. *S. angustifolium* Miller. Not usually darker in drying; more or less tufted and glaucous; 1-3 dm. high, stem and leaves usually very narrow (1-2 mm. wide), or sometimes a little wider and grading into the next; stems usually simple; bracts rather narrow, especially the outer, and often purplish, inner only exceptionally more than half as long as the outer; perianth-segments 10-12 mm. long; capsules 4-6 mm. long; rather dark. Golden; Rockies.

10. *S. montanum* Greene. Not becoming dark in drying; plants not glaucous, often yellowish-green; 3-5 dm. high; stems more broadly winged; the outer bract broad; capsule light green to straw-color, almost 6 mm. long; Golden; Naramata.

ORCHIDACEÆ (ORCHID FAMILY)

Perennial herbs with parallel veined leaves; flowers in a raceme or spike, sometimes solitary; perianth superior; sepals 3, nearly alike; petals 3, the lower (the *lip*) larger than the other 2, and assuming many different and specialized forms, often spurred; at the base of the lip in the axis of the flower is the *column*, composed of a single fertile stamen (or in *Cypripedium* of 2 and the rudiment of a third) coalescent with the style; anther cells sessile near the sessile stigma; pollen usually in 1-4 masses (pollinia); ovary 3-valved; seeds very numerous, minute.

Two fertile anthers, lip a large inflated sac.	1. <i>Cypripedium</i> .
One fertile anther.	
Plants saprophytic without green leaves	2. <i>Corallorhiza</i> .
Plants with green leaves.	
Flower and leaf solitary	3. <i>Calypso</i> .
Flowers several.	
Flowers spurred.	
Flowers white or greenish, pollinia glands naked	4. <i>Habenaria</i> .
Flowers spotted with red, pollinia glands in pouch . . .	5. <i>Orchis</i> .

Flowers not spurred.	
Leaves cauline, 2 near middle of stem	6. <i>Listera</i> .
Leaves more than 2.	
Basal leaves ovate, often variegated	7. <i>Peramium</i> .
Stems bracted	8. <i>Epipactis</i> .
Stems leafy	9. <i>Spiranthes</i> .
Leaves narrow, elongated, not variegated	

1. CYPRIPEDIUM (LADY'S SLIPPER)

Glandular-puberulent herbs with coarse fibrous roots and leafy stems; the lip of a much-inflated sac; perianth apparently lacking one segment as two lateral sepals have united except at the very apex; column incurved, concealed by a recurving sterile stamen; fertile stamens 2, at the base of the column. (Gk. *Kypris*, Venus, *pedilon*, a shoe).

Lip whitish.

Sepals shorter than the lip 1. *C. passerinum*.

Sepals longer than the lip 2. *C. montanum*.

Lip yellow 3. *C. parviflorum*.

1. *C. passerinum* Rich. About 2 dm. high; flower solitary, the upper sepal hood-like, nearly orbicular, the lip hardly 1.5 cm. long, white or pale magenta spotted with deep magenta, the lateral petals white. Damp open woods, Eastern slopes of the Rockies, perhaps not in B. C.

2. *C. montanum* Dougl. Stout, 2-5 dm. high; leaves ovate to broadly lanceolate; flowers 1-3, sepals and petals greenish brown, the petals the narrower and slightly twisted, about 5 cm. long; lip white with purple lines, about 2.5 cm. long; the sterile stamen yellow with purple spots. Damp open woods, Salmon Arm; Penticton; Victoria.

3. *C. parviflora* Salisb. Similar, more slender, leaves oval to lanceolate, flowers usually solitary; the ovate sepals and lanceolate petals light brown; petals about 4 cm. long; the light yellow more or less purple-spotted, lip about 3. cm. long. Woods, Lytton; Golden; Okanagan Valley, etc.

2. CORALLORHIZA (CORAL ROOT)

Brownish or yellowish herbs with much-branched coral-like, subterranean rootless stems, which send up bracted scapes, each bearing a raceme of livid flowers; spur short, free or adnate to the ovary; petals and sepals similar; pollen-masses 4 on the top of the column; capsules reflexed at maturity. (Gr. *korallion*, coral, *rhiza*, a root).

Lip white, not spotted	1. <i>C. innata</i> .
Lip white, spotted	2. <i>C. multiflora</i> .
Lip purplish or brown.	
Spur evident	3. <i>C. Mertensiana</i> .
Spur none	4. <i>C. striata</i> .

1. *C. innata* R. Br. Stems slender, 1-3 dm. high, with several scales; perianth pale, 1-nerved, narrow, 5-6 mm. long, lips whitish; 2-lobed above the base; spur a very small protuberance, at the summit of the ovary; capsule green, oblong or obovoid, 8-12 mm. long. Alaska southw.; Mt. Arrowsmith, V. I.; Field; Kootenay.

2. *C. multiflora occidentalis* Lindl. Stout, 3-6 dm. high; yellowish, purplish or brownish-red; few to many flowered; perianth about 1 cm. long, petals spotted, sepals red; the middle lobe of the lip much the longest; capsule obovoid on a short pedicel; spur adnate to the upper half of the ovary. Woods, common on V.I.; Rockies; Flowering in May.

3. *C. Mertensiana* Bong. Rather slender, 2-4 dm. high, dark red or purple, many flowered; perianth dark red, the divisions narrow, 8-9 mm. long, spur 3-4 mm. long, the upper half adnate to the ovary; lip narrow, entire or slightly toothed at base; narrowed to a claw; column 7-8 mm. long; capsule attenuate to a slender pedicel. Alaska to Cal. Kootenay; Woods, Coast Mts. and V. I.

4. **C. striata** Lindl. Stems stout, 3-6 dm. high with several bracts; flowers few to many, the segments red-purple with dark purple veins, 12-16 mm. long, broad, oblong-elliptical; lip entire; capsule ellipsoidal, short pedicelled; column 5 mm. long. Nanaimo; Kootenay; Kaslo.

3. CALYPSO

Low 1-flowered plants with a single broad leaf, from a superficial corm; sepals and petals alike, spreading or ascending, oblong-lanceolate, pink or magenta; lip brown-purple spotted, larger, saccate, with 3 rows of white (or yellow) hairs on apron-like covering of the lip; column winged, petal-like, bearing the lid-like anther near its summit; pollen masses 2, each 2-parted, without caudicles. (Name from the goddess Calypso).

1. **C. bulbosa** (L.) Oakes. About 1.5 dm. high; leaf ovate, with a slightly cordate base, glaucous beneath; lip 2 cm. long, slightly longer than the other perianth-segments. Under evergreens with Hypnum near Vic., in rich woods under *Acer macrophyllum*. Nanaimo; rare about Vanc.; eastw. through the Rockies; Alaska to Cal.

4. HABENARIA (REIN ORCHID)

Glabrous plants, stem leafy or bracted, roots elongated or fusiform; flowers small, in loose or dense racemes; the lip in ours usually entire; the pollen masses attached by caudicles to exposed, viscid disks, or glands, in front of the column. The following subgenera are often given generic rank. (*L. habena*, a thong, from the shape of the lip).

- | | |
|---|--------------------------------|
| Lip toothed at apex, glands surrounded by a thin membrane (<i>Cæloglossum</i> Parl) | 1. <i>H. bracteata</i> . |
| Lip entire, glands naked. | |
| Stem scapose, leaves basal, abruptly reduced to bracts. | |
| Leaf solitary, sepals 3-nerved (<i>Lysiella</i> Rydb.) | 2. <i>H. obtusata</i> . |
| Leaves 2, sepals 3-nerved (<i>Lysias</i> Rydb.) | 3. <i>H. orbiculata</i> . |
| Leaves several, usually withered at flowering sepals 1-nerved (<i>Piperia</i> Rydb.) | |
| Spur less than twice as long as the lip | 4. <i>H. unalaschensis</i> . |
| Spur more than twice as long as the lip. | |
| Spike dense, flowers whitish | 6. <i>H. Michæli</i> . |
| Spike loose, flowers greenish | 5. <i>H. elegans</i> . |
| Stem leafy, leaves gradually reduced to bracts, not early withering. | |
| sepals 3-nerved (<i>Limnorchis</i> Rydb.) | |
| Flowers greenish. | |
| Spike 1 dm. long, rather dense | 7. <i>H. viridiflora</i> . |
| Spike elongated, loose | 8. <i>H. stricta</i> . |
| Flowers white. | |
| Leaves less than 1 cm. wide, the bracts all shorter than the flowers | 9. <i>H. graminifolia</i> . |
| Leaves 1 cm. wide or more, the lower bracts exceeding the flowers. | |
| Plants under 3 dm. high; petals linear-lanceolate | 10. <i>H. leptoceratitis</i> . |
| Plants exceeding 4 dm. in height, petals lanceolate | |
| Lip 5 mm. long, spur mostly shorter | 11. <i>H. borealis</i> . |
| Lip 7-8 mm. long, spur longer. | |
| Spur $\frac{1}{2}$ - $\frac{1}{2}$ longer than the lip | 12. <i>H. leucostachys</i> . |
| Spur and lip sub-equal | 13. <i>H. dilatata</i> . |

1. **H. bracteata** R. Br. (Long-Bracted H.) Rather stout, 2-6 dm. high; lower leaves oblanceolate to obovate-obtuse, the upper lanceolate, acute; floral bracts 2-4 times the length of the green flowers, petals linear, lip oblong to slightly spatulate, 2 or 3 toothed at apex, and twice the length of the clavate whitish spur. Damp woods Alaska to N.S. Goldstream, (Vic.); Col. Val.

2. **H. obtusata** Richards. Plants 1-3 dm. high, the solitary leaf basal, oblong or obovate 1.5 dm. long; flowers green or whitish, 5-15 in a loose raceme; the upper sepal roundish, lip linear-lanceolate, 6 mm. long, often hooked, hardly equaling the curved, tapering spur. Swamps and woods, Alaska to Wn. and eastw.; Field; Donald.

3. *H. orbiculata* Torr. Plant 2-3 dm. high; leaves 1-2 dm. long, spreading, silvery beneath, the scape with 1 or more bracts; flowers greenish, the upper sepal roundish, the lateral oblong-lanceolate 1 cm. long, lip linear-oblong 1.5-2 cm. long, decidedly shorter than the spur. Alaska to Wash. and eastw. Common in woods at alt. of 2,000 ft., Mt. Cheam; Dewdney; Trail; Donald.

4. *H. unalaschensis* (Spreng.) Wats. Stem rather slender, 3-5 dm. high with a few basal leaves 1-1.5 dm. long, withering at flowering or soon after; spike long and lax, bracts shorter than the flowers in spirals hardly 1 cm. long, including the ovary; petals and sepals 2-4 mm. long, upper sepal oblong-obtuse, much wider than the petals, lip oblong-ovate slightly hastately lobed near the base; spur filiform or slightly clavate, 3-5 mm. long exceeding the lip, but shorter than the ovary. Dry open woods, Alaska to Wn.; Cameron Lake; Goldstream, V. I.; Rockies.

5. *H. elegans* Lindl. Stems rather slender, 3-7 dm. high, the large basal leaves withering at flowering; spikes 1-3 dm. long, bracts shorter than the flowers; upper sepal ovate-lanceolate, petals about as long 3.5-5 mm. long, lip oblong-lanceolate, slightly hastate at base; spur filiform 8-18 mm. long exceeding the ovary, at first set perpendicularly to the stem. Common in dry woods, V. I. to the Rockies; Victoria; Elgin; (Lower Fraser).

There are two forms:—

- | | |
|---|------------------------------------|
| Spur 12-18 mm. long, lip lanceolate, spike rather dense | 1. <i>H. multiflora</i>
(Rydb.) |
| Spur 8-12 mm. long, lip ovate, lanceolate, spike lax | 2. <i>H. elegans</i> . |

The former occurs at Elgin and near Victoria.

6. *H. Michæli* Greene. Stout, leaves withering before flowering, 1-1.5 dm. long; stem leaves reduced to bracts; spike dense, 1-1.7 dm. long; flowers whitish, the perianth-segments more or less green-veined, 4 mm. long, upper sepal oblong or ovate, the lateral oblong, all obtusish, petals lanceolate blunt, lip ovate, blunt, 4 mm. long; spur filiform, a little longer than the lip. Grassy places under oaks, Victoria.

7. *H. viridiflora* Rydb. Stout, 2-6 dm. high, the lower leaves oblong-lanceolate, obtuse, the upper lanceolate acute; the lower bracts slightly exceeding the flowers; flowers greenish-yellow, unpleasantly scented, rather dense in a raceme about 1 dm. long, lip 5 mm. long, lanceolate; spur shorter than or about equaling the lip; clavate; petals about 5 mm. long; anther cells oblique, meeting at apex. The western representative of *H. hyperborea*. Alaska to Nfld., chiefly in eastern B. C. Armstrong; Cranbrook; Rockies.

8. *H. stricta* Lindl. Similar; raceme open, 1.5-3 dm. long, the lower bracts much longer than the greenish flowers; upper petals sometimes purplish, about 4 mm. long; lip linear-lanceolate, the spur slightly shorter to as $\frac{1}{2}$ long, clavate; a wide connective between the erect anther-cells. *H. gracilis* Wats. Common in wet places, V. I.; on the coast, and in the Coast Mts.; Revelstoke; Alaska.

9. *H. graminifolia* (Rydb.) Slender, 3-5 dm. high; leaves narrow, acute, 3-8 mm. wide, 1.3 dm. long, or less; spike 5-9 cm. long; bracts shorter than the flowers; these white, 12-15 mm. long; upper sepal ovate, obtuse, 4-5 mm. long, very slightly shorter than the ovate obtuse lower ones; petals narrow; lip moderately dilated at base, but not rhombic, 6-7 mm. long; spur slightly clavate as long to half longer. Not common. Swamp, Cameron Lake, V. I.; Alaska.

10. *H. leptoceratitis* (Rydb.) Slender, 2-4 dm. high; roots slender; lower leaves 4-8 cm. long, 1-1.5 cm. wide, reduced above; spike less than 1 dm. long; the lower bracts somewhat longer than the white flowers; sepals 3-4 mm. long, lanceolate, petals linear-lanceolate, about equaling the sepals; lip lanceolate, somewhat dilated at base; spur filiform, strongly curved forward, a little exceeding the lip. Alaska to Wn.; Tulameen River.

11. *H. borealis* Cham. Tall and leafy, 4-8 dm. high; lower leaves oblanceolate obtuse, the rest lanceolate, acute, 5-15 cm. long, 1-2.5 cm. wide; spike rather dense, 1-2 dm. long, the lower bracts often much exceeding the flower; flower 10-14 mm. long, white or sometimes greenish-white; upper sepal ovate, 4-5 mm. long, the lateral and the petals lanceolate; lip dilated at base, about 5 mm. long; spur more or less clavate usually shorter than the lip. The western representative of *H. dilatata* in the Rocky Mt. region; common, Alaska to Wn.

12. *H. leucostachys* (Lindl.) Wats. Leafy, stout, 6-12 dm. high; lower leaves 1-3 dm. long, 1.5-4.5 cm. wide, gradually reduced to bracts above; bracts exceeding the flowers at the base of the spike, which is 1-3 dm. long; flowers 15-20 mm. long, pure white, fragrant; upper sepal ovate, obtuse, 5-6 mm. long; the lateral lanceolate 6-8 mm. long; petals lanceolate, a little shorter than the upper sepal; lip dilated about the middle into a broad rhombic base, about 7.5 mm. long; spur somewhat or not at all clavate, acutish, about half longer than the lip. Alaska to Wn., in damp soil or swamps. Var. *robusta* Rydb. Very stout and tall, spike long and dense; spur usually clavate, obtuse, about $\frac{1}{2}$ longer than the lip. Duncan, V. I.; Tulameen.

13. *H. dilatata* Hook. Stout or somewhat slender and tall with the habit of *H. leucostachys*; flowers about 15 mm. long, white, fragrant; upper sepal ovate, obtuse, 6 mm. long, shorter than the blunt lower oblong-lanceolate ones and about equaling the blunt lanceolate petals; lip 7-7.5 mm. long with a dilated base; spur a little longer or a little shorter than the lip, slightly or not at all clavate. Wet ground; Lulu Is.; Victoria. This form may be distinct from the typical species which Dr. Rydberg says does not occur west of the Rockies.

5. ORCHIS (ORCHID)

Plants with 1 or 2 basal leaves and a short raceme of pinkish flowers; lip spurred; pollen in 2 masses borne on a slender stalk tipped with a gland enclosed in a small pouch above the orifice of the spur. (The ancient name).

1. *O. rotundifolia* Banks. Leaf 1, orbicular to oblong; scape 1-2 dm. high; flowers pink or whitish, lip white, spotted with purple, 3 lobed, the middle lobe the longest, notched at the apex; the lateral sepals longer than the petals which curve over the column; pollen greenish. Golden; Peace River.

6. LISTERA (TWAYBLADE)

Low slender forest plants bearing a pair of sessile leaves about the middle of the stem and a raceme of small greenish flowers; lip longer than the sepals, 2-lobed or 2-cleft, perianth spreading, or reflexed, pollen-masses 2 with a minute gland, borne on the back of the column near the apex. [In honor of Lister an English naturalist].

Column very short, 0.5-1.5 mm. long	1. <i>L. nephrophylla</i> .
Column 2-4 mm. long.	
Lip 5-6 mm. long, ovary glabrous	2. <i>L. caurina</i> .
Lip 7-9 mm. long, ovary glandular	3. <i>L. convallarioides</i> .

1. *L. nephrophylla* Rydb. Slender 1-1.5 dm. high, glabrous except just above the leaves; leaves round to somewhat triangular or reniform 1.5-2.5 cm. long, glossy especially beneath, obtuse, with a mucro; flower bracts 1-1.5 mm. long, the pedicels not much longer, shorter than the ovary; lip 4 mm. long, 2-cleft with long acute apical lobes and a tooth on each side near the base. (near *L. cordata* R. Br.) Cool woods, V. I. to Rockies; Alaska.

2. *L. caurina* Piper. Very slender, 1-2 dm. high, slightly glandular above the leaves; leaves oblong-elliptical, obtuse or pointed; flower bracts not half as long as the very slightly glandular, very slender pedicels, which reach nearly 1 cm. in length; lip not ciliate, with obtuse apical lobes and 2 linear lobes near the base; ovary glabrous or slightly glandular. Cameron Lake; Black Mt. Vancouver; Mt. Cheam.

3. **L. convallarioides** Torr. Slender, 1-2 dm. high, very glandular above the leaves; leaves suborbicular to elliptical, 2.5-5 cm. long, obtuse or very shortly cuspidate; flowers sometimes in pairs; bracts 4 mm. long, the glandular pedicels not much longer; lip broadly cuneate, slightly ciliate at tip, with 2 short obtuse apical lobes and 2 short teeth near the base. Mt. woods V. I. to Rockies; Alaska.

7. PERAMIUM (RATTLESNAKE PLANTAIN)

Herbs with variegated evergreen basal leaves and bracted scapes from creeping rootstocks; flowers white or cream in a short, dense, 1-sided raceme, the petals united with the upper sepal to form a hood; lip concave, curved; anther at the top and back of the column, the 2 pollen-masses attached to a gland projecting between the teeth terminating the column; inflorescence glandular. (*Goodyera*) (*L. per*, through, *amium*, love, in allusion to medicinal properties).

Lip saccate, margin revolute.

P. repens

Lip merely concave, margin involute.

P. decipiens

1. **P. repens** Salisb. Scape 1-2 dm. high, glandular-pubescent; leaf-blades 1-3 cm. long, ovate, dark green, generally with white along the veins; perianth greenish-white 4 mm. long; anther blunt. Mossy woods, Rockies, and eastward.

2. **P. decipiens** (Hook). Ames. Scape 2-4 dm. high; glandular-pubescent; leaf-blades ovate-lanceolate, 3-7 cm. long, usually white along the veins, especially along the midrib; perianth dull-white, 7-8 mm. long; anther acuminate. (*Goodyera Menziesii* Lindl.) Dry woods, V. I. to Quebec. Common.

8. EPIPACTIS (R BR.)

Tall herbs with leafy stems from creeping rootstocks, and few rather large flowers in racemes with conspicuous bracts; perianth divisions nearly equal; lip saccate at base, narrowed in the middle and dilated at the apex; mature capsule deflexed, pollen-masses attached to a gland capping the rounded apex of the column. (The Greek name).

1. **E. gigantea** Dougl. Stout, 3-9 dm. high, nearly smooth, leaves ovate below, lanceolate above; flowers greenish veined with purple. Damp places under evergreens. Osoyoos Lake, B. C. to Cal.

9. SPIRANTHES (LADIES' TRESSES)

Plants with thick, clustered roots, and cream-colored flowers arranged spirally; leaves long and narrow, basal; stem bracted; perianth seemingly with 4 divisions as the 2 upper are united; lip narrowing below the middle and crisply dilated at reflexed apex; the ovate stigma on the front of the column, the anthers behind; pollen-masses 2, in thin plates, and attached to a narrow, tapering gland which projects between the 2 teeth of the column. (Gk. *speira* a coil, and *anthos*, a flower).

1. **S. Romanzoffiana** Cham. Slightly glandular-pubescent above from roots 5-8 mm. thick; leaves oblong-lanceolate to linear, often glaucous beneath; cauline bracts 2-5; raceme dense, its bracts often longer than the 3-ranked flowers; apex of lip strongly recurved. Swamps and dry or moist soil, Alaska Southw.; Vancouver. Flowering in July and August.

SALICACEÆ (WILLOW FAMILY)

Diœcious shrubs or trees, the flowers in catkins, one in each bract (scale) without a perianth, fruit a 1-celled 2-4-valved pod, with 2-4 parietal or basal placentæ, stigmas 2, often lobed.

Scales entire, stamens few 1. *Salix*.
Scales fringed, stamens many 2. *Populus*.

1. SALIX (WILLOW)

Leaves mostly long and pointed, entire or toothed; buds covered by a single scale; sterile flowers, usually with 2 stamens, sometimes with 1 or 3-7; fertile flowers of a single ovary of 2 carpels; both kinds of flowers with a gland; catkins appearing with or before the leaves, often with bracts at the base. (The Latin name). The measurements below refer to the mature catkins or capsules, and the term scale is used for the floral bracts.

Scales pale, more or less deciduous; filaments hairy.

Stamens 3-7; capsules glabrous.

Petioles not glandular; stipules none 1. *S. amygdaloides*.

Petioles glandular, stipulate 2. *S. lasiandra*.

Stamens 2.

Leaves silky-pubescent on both sides.

Stigmas linear.

Fertile catkins 5-8 cm. long, scales obovate 3. *S. sessilifolia*.

Fertile catkins 2-3 cm. long, scales oblong 4. *S. macrostachya*.

Stigmas short and thick 5. *S. argophylla*.

Leaves glabrous at maturity, at least above; capsule glabrous; stigmas short.

Leaves linear, capsules about 7 mm. long 6. *S. fluviatilis*.

Leaves elliptical-oblancoate, capsules about 5 mm. long 7. *S. melanopsis*.

Scales dark or brown at least at the tip, sometimes pink; stamens 2 (1 in *S. sitchensis*) glabrous.

Capsules pubescent or tomentose.

Plants 1 cm. to 9 dm. high, stems mostly prostrate; distinctively

Alpine.

Style 1-2.5 mm. long 8. *S. arctica*.

Style none.

Plants 2-4 cm. high, leaves 5-12 mm. long 9. *S. nivalis*.

Plants and leaves much larger.

Leaves silky-villous beneath 10. *S. vestita*.

Leaves glabrous 11. *S. saximontana*.

Plants more than 1 m. high; nos. 19, 20, 21, 23 and 24 distinctively alpine.

Pistillate catkins 0.5-1.5 cm. long.

Leaves glaucous-pubescent beneath, scales often pink 16. *S. Geyeriana*.

Leaves tomentose beneath, scales brown.

Leaves 3-7 cm. long, on tomentose petioles 13. *S. candida*.

Leaves 2-3 cm. long, on pubescent petioles 14. *S. brachycarpa*.

(Occasional forms of *S. Scouleriana* may come here).

Pistillate catkins longer.

Leaves green and glabrous beneath 12. *S. Maccalliana*.

Leaves otherwise beneath.

Style short or none.

Pedicels finally 3 mm. long, scales pinkish 15. *S. Bebbiana*.

Pedicels shorter, scales usually dark 17. *S. Scouleriana*.

Style 0.7-2.5 mm. long.

Capsules 3-5 mm. long, style hardly 1 mm. long.

Stamen 1, stipules present 18. *S. sitchensis*.

Stamens 2, stipules wanting 19. *S. subcœrulea*.

Capsules 6-9 mm. long.

Leaves very glaucous, and somewhat pubescent beneath, 1.5 cm. broad or less; style 0.7-1 mm. long 20. *S. glaucops*.

Leaves tomentose or pubescent beneath.

Style short 21. *S. Drummondiana*.

Style 1.3-2.5 mm. long.

Pistillate catkins 1-3 cm. long, leaves oblong-oblancoate, less than 1.5 cm. wide 13. *S. candida*.

Pistillate catkins 3-12 cm. long, leaves broader.

Stipules usually absent; plants of the coast, 1-5 m. high 22. *S. Hookeriana*.

Stipules present; plants of the Rockies, less than 1 m. high.

Leaves acutish at base 24. *S. albertana*.

Leaves rounded or subcordate at base 23. *S. Barrattiana*.

Capsules glabrous or practically so.

Styles 0.8-2.5 mm. long; alpine except No. 22.

Leaves glaucous, and either glabrous or slightly pubescent beneath.

Pistillate catkins sessile or sub-sessile with a few bracts at base.

Capsule green, plants of coast region 22a. *S. Hookeriana* var. *laurifolia*.

Capsule reddish, plants of Selkirks and Rockies 25. *S. monticola*.

Pistillate catkins on leafy branches 26. *S. Barclayi*.

Leaves tomentose beneath, stipules none or occasional 22. *S. Hookeriana*.

Leaves green and pubescent to glabrate beneath, stipules large.

Leaves glabrous above 26. *S. Barclayi*.

Leaves pubescent on both sides 27. *S. commutata*.

Styles less than 0.8 mm. long, not distinctively Alpine.

Leaves coriaceous, revolute 28. *S. pedicellaris*.

Leaves membranaceous, not revolute.

Leaves more or less glaucous beneath.

Pedicels of capsules about 1.5 mm. long 30. *S. cordata*.

Pedicels about 3 mm. long 29. *S. Mackenziana*.

Leaves green beneath.

Leaves serrulate.

Leaves ovate to obovate, thin; pedicels 2.5-4 mm. long 32. *S. pyrifolia*.

Leaves elliptic-oblancoate to lance-oblong; thickish

pedicels 1-2 mm. long 33. *S. pseudomyrsinites*

Leaves entire, pedicels 3 mm. long 31. *S. proluxa*.

1. *S. amygdaloides* Anders. Shrubs or small trees with flaky bark and catkins on short leafy branches, appearing with the leaves; leaves lanceolate to oblong-oblancoate, acuminate, minutely glandular-serrate, pale or glaucous beneath, petioles 5-20 mm. long; stipules fugaceous, small; staminate catkin slender, 8-10 mm. thick, the fertile loose, 4-8 cm. long, capsule glabrous, 4-6 mm. long, pedicels 2 mm. long, style short or none. Along streams, East Kootenay.

2. *S. lasiandra* Beuth. Shrubs, becoming large trees at the coast with furrowed bark; the catkins appearing after the leaves; leaves often 15 cm. long, broadly lanceolate, acute or acuminate, serrate, glaucous or pale beneath, glands developing at the base of the blade; stipules small or large, glandular-serrate; petioles 1-2 cm. long; staminate catkins stout, 10-15 mm. thick, the fertile rather loose, 3-10 cm. long; capsule glabrous, pedicels 2 mm. long; style evident. V. I. to Kootenay; common in the coast region. Var. *Lyallii* Sarg. Leaves becoming glaucous beneath, the apex very long-acuminate. Vancouver; Donald. Var. *caudata* Nutt. Leaves smaller, thicker, green throughout. (*S. Fendleriana*). Shuswap Lake; Kootenay Lake.

3. *S. sessilifolia* Nutt. Shrub or small tree, 2-10 m. high, the older branches glabrous, brown; leaves oblong 5-10 cm. long, 1-1.8 cm. wide, obscurely denticulate, hoary when young, with short, grey pubescence, sometimes becoming glabrous; catkins 6-8 cm. long, often in 2's or 3's on leafy shoots, scales greenish; becoming brown, rather broad, obovate, short-silky to nearly glabrous; capsule tomentose to glabrate, sessile, style evident, sometimes divided to the base; stigmas linear. New Westminster; not common.

4. *S. macrostachya* Nutt. Leaves smaller, more or less villous-pubescent, aments 2-3 cm. long, on short leafy branches; scales densely villous, oblong; capsules clothed with long lax hairs. Kettle River; Koksilah, V. I.

5. *S. argophylla* Nutt. Shrub, 4-5 m. high, the stems distinct, forming thickets not clumps; twigs slender, nearly glabrous or finely pubescent; leaves 5-7 cm. long, 5-15 mm. broad, entire, or remotely denticulate, finely appressed-pubescent on both faces, stipules none or minute; catkins often in small clusters, sometimes staminate and pistillate on the same plant, or the pistillate partly staminate; pistillate catkins 3-5 cm. long, on longer leafy branches; capsule silky, becoming glabrous, 5-7 mm. long, sessile; stigmas sessile, short, about twice as long as thick; pistillate scales acutish, narrower than the staminate, both crisp-hairy below. Common east of the Cascades.

6. *S. fluviatilis* Nutt. A shrub or small tree 1-10 m. high; branches brown, canescent when young, usually becoming glabrous; leaves linear-lanceolate to linear-oblong, 5-12 cm. long, 2-15 mm. wide, becoming glabrous, entire or sparingly dentate, green on both sides, stipules minute or none; catkins appearing with the leaves, on short leafy branches, linear-cylindrical, 2-5 cm. long, the pistillate loose at base, capsule glabrous; stigmas short, style short or sessile, pedicel short; scales deciduous. (*S. longifolia* Muhl.) Northern British Columbia; Bow River and eastward.

7. *S. melanopsis* Nutt. Shrub or small tree, dark green, 3-5 m. high; leaves oblanceolate or elliptical, acute at both ends, 4-7 cm. long, 6-15 mm. wide, closely denticulate or subentire, dark green, glabrous above, paler and veiny beneath; stipules lanceolate, fertile catkins 3-4 cm. long, 7-10 mm. wide, scales thinly pilose; capsule glabrous, nearly sessile, 4-5 mm. long; style none; stigmas short, divided. Columbia Valley, Revelstoke. A specimen from Revelstoke with obtuse, thick leaves, closely white-dotted, somewhat blue-green beneath; style very short, but distinct, is also referred here.

8. *S. arctica* Pall. Stems prostrate, with ascending glabrous branches, 1 dm. high; leaves elliptical to obovate, 2.5-6 cm. long, 1.5-3.5 cm. broad, entire, glaucous beneath, glabrous above, becoming so beneath; petioles 6-15 mm. long, slender; pistillate catkins on leafy branches, but with a naked, somewhat elongated, peduncle, 3-8 cm. long; scales dark purple, obtuse; capsule tomentose, nearly sessile. Mts.; Mt. Cheam, Rockies, northward. *S. petrophila* Rydb. (*S. arctica* R. Br. Var. *petraea* And.) has smaller leaves, 1.5-4 cm. long, 1-1.5 cm. wide, on shorter petioles.

9. *S. nivalis* Hook. A few cm. high from slender buried stems; leaves 5-12 mm. long, glaucous and reticulate beneath, glabrous above, elliptical to obovate, mostly obtuse; petioles 2-8 mm. long; fertile catkins 3-6-flowered, less than 1 cm. long; capsules 2-3 mm. long, tomentose, scales almost glabrous. Mts.; Mt. Garibaldi to Rockies.

10. *S. vestita* Pursh. Shrub, 3-10 dm. high, ascending; twigs stout, brown or yellow, glabrous; leaves elliptical to suborbicular or obovate, rounded at apex, 3-4 cm. long, obscurely crenulate, glabrous and somewhat rugose above; fertile catkins 2 cm. long, slender; the staminate longer, linear, both long-peduncled; scales tomentose; capsules 4-5 mm. long. Selkirks and Rockies.

11. *S. saximontana* Rydb. Forming mats, the branches 1 dm. high, from prostrate stems; leaves elliptical or obovate, rounded or barely pointed at apex, 1.5-2.5 cm. long, glabrous, revolute, light-green above, glaucous beneath; fertile catkins 0.8-2 cm. long on naked peduncles; scales yellowish, nearly glabrous; capsules 3-4 mm. long, tomentose. (*S. reticulata* Bebbot L.) Lake Louise to California; Mt. Cheam.

12. *S. Maccalliana* Rowlee. Clumps, 1-2 m. high; bark brown or young twigs yellow, glabrous; leaves oblong, 4-9 cm. long, mostly rounded at base, acute or blunt at apex, crenate-serrulate, thickish, glabrous on both sides, clearly reticulated beneath, exstipulate; catkins on short leafy peduncles, the pistillate 2-7 cm. long; capsules 9-15 mm. long, tomentose; pedicels 1-1.5 mm. long; styles 1.2-2.5 mm. long, stigmas short. Swamps or low land. Crow's Nest Pass; Armstrong.

13. *S. candida* Fluegge. One m. high or less; branches stout, at first white-tomentose; leaves oblong-oblanceolate, 3-7 cm. long; dark green, rugose, thinly tomentose above, densely white-tomentose beneath; stipules acute; anthers purple or red, the staminate catkins 2 cm. long, the pistillate 1-3.5 cm. long; capsules white-tomentose, 6-9 mm. long; styles 1-2 mm. long; stigmas linear, medium, pedicels short or none. Armstrong; Crow's Nest Pass; Quesnel.

14. *S. brachycarpa* Nutt. Low, 0.5-1.5 m. high, with slender branches; leaves oblong or oblanceolate, mostly rounded at base, and abruptly acute

at apex, 2 or 3 cm. long, less than 1 cm. wide, white or yellow-tomentose beneath, green and pubescent above; stipules none; catkins numerous, the staminate globose; the pistillate subglobose to oblong, 0.5-2 cm. long on short peduncles; capsules tomentose, 4-6 mm. long, subsessile; style 0.8-1.3 mm. long; stigmas linear. (*S. desertorum*) Rockies; Golden; Clinton.

15. *S. Bebbiana* Sarg. A tall shrub with few stems, or a small tree; branches brown, pubescent or glabrate; leaves 2-4 cm. long, obovate-elliptical, pubescent to glabrate on both sides, more or less glaucous beneath entire; stipules dentate, small or none; pistillate catkins when mature 2-5 cm. long, lax; capsules long-beaked, thinly silky 6-9 mm. long on pedicels 3-4 mm. long, style short or none; stigmas linear, scales pink. Common east of the Cascades. Kamloops; Armstrong; Crow's Nest Pass. Alaska.

16. *S. Geyeriana* Anders. Shrub 1-4 m. high; twigs glabrous, black with bluish bloom; the leaves oblong or oblanceolate, acute, hardly 1 cm. broad, 2-5 cm. long, glaucous-pubescent beneath, green but thinly silky above; margins entire, slightly revolute; stipules none, catkins 0.7-1.5 cm. long, short-peduncled with 2-3 leafy bracts, erect or more or less reflexed, appearing with the leaves; capsules 5-6 mm. long, thinly pilose or almost tomentose when young, style short, or none; stigmas short, pedicel 2-3 mm. long; scales pink at tip. Wet places; Kootenay. Var. *meleina* Taller, 1-7 m. high; twigs black or green and black, without bluish bloom, the older branches often banded with grey and black; leaves oblong, soon glabrous above, very glaucous beneath, the hairs on the lower face becoming more or less brown. The coast form; Shawnigan; Victoria; New Westminster.

16a. *S. Geyeriana* var. *meleina* X *S. sitchensis*. Leaves (when catkins are mature) much as in *S. Geyeriana* var. *meleina*, but more pubescent and broader; fertile catkins about twice as long, the capsules with the short pedicels of *S. sitchensis*.

17. *S. Scouleriana* Hook. Shrub or small tree with rather slender, puberulent branches; old bark grey; leaves obovate and oblanceolate, 2.5-5 cm. long, acute at base, entire or serrulate towards the base, glabrous above, finely silky, usually becoming brown beneath; stipules acute; sterile catkins stout, fertile, sessile, soon recurving, appearing long before the leaves, 2.5-6 cm. long; scales black, sometimes pink, on the upper half, acute, thinly pilose; capsule 6-9 mm. long, short-pedicelled, pubescent, style obsolete, stigmas long, entire or divided. The earliest willow to flower. V. I. to Rockies and Alaska. Very variable, presenting many ill-defined forms. Var. *flavescens* (Nutt.) Shrub often becoming a tree, with coarse twigs and longer oblanceolate or broadly obovate leaves, 5-10 cm. long, which in moist situations often remain tomentose beneath, in drier becoming silky and finally brown beneath. These are 2 recognizable forms of this var. (a) Leaves prevailinglly obovate and obtuse, 4-6 cm. broad, common on V. I. (b) Leaves prevailinglly oblanceolate and acute; but the two intergrade. (*S. Nuttallii*). Alaska to Cal.

17a. *S. Hookeriana* X *S. Scouleriana* var. *flavescens*. Female plant. Leaves much as in *S. Hookeriana*, but stipules common; catkins both erect and recurving, stigmas long; Lulu Island. Male plant; habit and leaves of *S. Hookeriana*, but stipules common; observed too late to determine the nature of the pollen, which in hybrids is abortive; New Westminster. Forms of *S. Hookeriana* with long stigmas are by no means rare, but if these are hybrids, the influence of var. *flavescens* is very slight.

18. *S. sitchensis* Bong. Usually in clumps 2-10 m. high, branches downy when young, becoming glabrous; leaves oblong, or oblanceolate, acute or rounded at base with a short lustrous tomentum beneath, lightly silky and green above, 1-2.5 cm. wide, 4-7 cm. long, usually entire; stipules obtuse, sometimes wanting; pistillate catkins short-peduncled, appearing with the

leaves, 2.5-9 cm. long, 6-8 mm. thick; stamen 1; capsule densely tomentose; style and pedicels about 1mm. long; stigmas short. Very common at the Coast; Quesnel; Crawford Bay; Alaska.

19. *S. subcœrulea* Piper. Shrub, 1-3 m. high; twigs glabrous, sometimes with a bluish bloom; leaves oblanceolate or narrowly elliptical-oblong, mostly acute at base, usually not more than 1.5 cm. wide, 2-5 cm. long, entire, with a lustrous tomentum beneath, as in *S. sitchensis*, entire green and lightly silky above, stipules none; stamens 2; pistillate catkins 2-4 cm. long, short-peduncled, capsule much as in *S. sitchensis*, style about 1mm. long, stigmas short, pedicel about 1mm. long. (Often referred to *S. pellita*). Common in the Selkirks and Rockies.

20. *S. glaucops* Anders. Subalpine shrub 1-2 m. high; branches glabrous or downy, the bark in papery flakes on the older; leaves obovate to oblong-obovate, acute or obtuse at base, mostly obtuse at apex, entire, 3-6 cm. long, very glaucous and more or less pubescent beneath, glabrous above or glabrate on both sides; usually turning blackish in drying; stipules small or none; filaments very slightly hairy at base; pistillate catkins 3-5 cm. long, 1-1.5 cm. thick on short, mostly leafy, peduncles; capsules gray-tomentose, 6-8 mm. long; styles 0.7-1 mm. long, sometimes divided; pedicels 1-1.5 mm. long; stigmas short. Common in the Rockies, Mt. Stephen; Crow's Nest Pass; Fort McLeod. Var. *glabrescens* Anders. Pistillate catkins often on longer and more leafy peduncles; capsules 8 mm. long, glabrescent, or glabrous and yellowish below and pubescent above. Two distinct forms are probably included here. Laggan, Alberta.

21. *S. Drummondiana* Barratt. Branches strict, long, rather stout, glabrous; leaves obovate-oblong, about 5 cm. long, 2.5 cm. broad above the middle, glabrous above, white-tomentose beneath, entire or slightly serrulate at the apex; stipules ovate; fertile catkins about 6 cm. long, dense; capsule densely silky, with short shining hairs, or sometimes glabrous; style rather short; stigmas short, entire or lobed. Rockies, Lat 52° and northward.

22. *S. Hookeriana* Barr. Shrub, 1-5 m. high; twigs usually densely pubescent; leaves oblong-elliptical or obovate, tomentose to thinly pubescent beneath, pubescent or becoming glabrate above, finally rounded at base, entire or crenulate, petioles 1.5 cm. long or less; stipules occasional; catkins large, sessile, appearing before the leaves, the fertile 3-11 cm. long (rarely hardly 1 cm. long at flowering) capsules 6-9 mm. long; tomentose, glabrous on the lower half, or sometimes nearly or quite glabrous, style 1.5-2 mm. long, stigmas short, entire or lobed; pedicels 1-1.5 mm. long; sometimes producing a second set of staminate catkins six weeks after the first. Low ground west of the Coast Range.

22a. Var. *laurifolia*. Stems ascending, twigs stout, as in species; less tomentose to nearly or quite glabrous; leaves finally shining above, strongly glaucous and more or less pubescent (not tomentose) beneath; petioles 1-2.5 cm. long; capsule glabrous or slightly pubescent at apex. The yellow leaves are very striking in the autumn, while in the species the leaves usually blacken. Near *S. Piperi* from which it differs mainly in the pubescence. Forms of *S. Hookeriana* with leaves approaching those of this var. and with tomentose twigs are not rare; and there can be no doubt that the capsule of *S. Hookeriana* is often nearly or quite glabrous.

23. *S. Barrattiana* Hook. Dwarf shrub, with balsamic odor; twigs stout, more or less silky; leaves oblong-obovate, 6-9 cm. long, cordate or rounded at base, silky above, tomentose beneath, slightly serrulate towards the more or less glandular base; stipules large, ovate, glabrate, glandular-serrulate; fertile catkins 8-12 cm. long, sessile or nearly so, with or without a few silky bracts at base; capsule tomentose, style 1.5 mm. long, pedicel short. Rockies; Yoho Valley; Lake Louise.

24. *S. albertana* Rowlee. Similar; low, with balsamic odor; leaves acutish at base, or at least not subcordate; pistillate catkins 5-6 cm. long, usually 2 on a branch, the black scale nearly equaling the silky-pubescent, sessile ovary; style 2 mm. long, deeply divided, stigmas bifid (? *S. Barrattiana* var. *angustifolia* Anders.) Alt. 6,500 Rockies; Alberta.

25. *S. monticola* Bebb. Shrub 3-5 m. high; branches glabrous or pubescent; leaves oblanceolate or elliptical, 4-7 cm. long, acute at apex, mostly rounded at base, more or less serrulate, glaucous beneath, glabrous on both sides or thinly pubescent above; stipules ovate, acute, or wanting; pistillate catkins 3-5 cm. long, on short leafy-bracted peduncles; capsules mostly reddish, 4.5-7 mm. long; styles 1-1.5 mm. long; stigmas short; pedicels 0.5-2 mm. long. Rockies. This description apparently includes more than typical *S. monticola*.

26. *S. Barclayi* Anders. Shrub 1-4 m. high; branches tomentose to glabrate; leaves elliptical to obovate, acute or rounded at base, rounded or slightly acute at apex, 2-4 cm. wide, glandular serrate or nearly entire, usually glaucous beneath, thinly pubescent to glabrate above; stipules large, ovate, acutish, often glandular; pistillate catkins 2-6 cm. long on leafy peduncles, scales brownish thinly to densely villous; capsules glabrous, sometimes thinly sericeous, often reddish or yellowish at base, 5-7 mm. long, pedicels 0.5-2 mm. long; styles 1-1.5 mm. long; stigmas short. Mts. Coast to Rockies; Roger's Pass; Mt. Cheam; Alaska.

27. *S. commutata* Bebb. Shrub 1-3 m. high; leaves broadly oblanceolate or oblong, abruptly pointed, tapering to the roundish base, densely or slightly silky, becoming glabrate or even glabrous; thinnish, green on both sides, lighter in color than in *S. Barclayi*; minutely glandular-denticulate, stipules large, ovate or orbicular, glandular; fertile catkins 4-6 cm. long, on leafy peduncles with 4-7 leaves; capsule glabrous or pubescent at apex, often reddish; pedicel 1 mm. long; style about 1 mm. long, sometimes bifid at apex, stigmas short. (*S. conjuncta* Bebb.) Mt. Cheam; Roger's Pass; Rockies; Alaska.

28. *S. pedicellaris* Pursh. Shrub 1-3 m. high; leaves oblong-obovate, the largest 6 cm. long, obtuse or pointed, slightly revolute, entire or nearly so, glabrous, glaucous beneath, short-petioled, stipules wanting; fertile catkins 3-4 cm. long, loosely flowered, on leafy branches; capsules glabrous, the pedicels exceeding the nearly smooth scales; style less than 0.5 mm. long; stigmas short. Swamps, Coast Mts.; Selkirks; Clanwilliam; Alaska.

29. *S. Mackenziana* Barr. Shrub or small tree; twigs glabrous or sometimes tomentose; leaves oblong to lanceolate or oblanceolate, rounded or even cordate, sometimes acute at base, acuminate at apex, serrate, glaucous beneath, soon glabrous or the pedicels pubescent; stipules large, obtuse catkins on short peduncles; appearing with the leaves; stamens sometimes united at base; pistillate catkins 2-5 cm. long, rather loosely flowered, the axis usually very woolly (that of the sterile always so) pedicels 3-4 mm. long, about as long as the capsule, and twice as long as the scale; styles 0.3 mm. long, stigmas short, emarginate; young leaves and the capsule often reddish. (*S. cordata* var. *Mackenziana* Hook.) Common V.I. to Alaska and Rockies; New Westminster.

30. *S. cordata* Muhl. With the same range as the preceding species, but apparently not so common; very similar, distinguished by the shorter pedicels 1.5-2 mm. long, about equaling the scale, and the longer capsules, 5-7 mm. long.

31. *S. proluxa* Anders. Shrub, 3-5 dm. high, branches glabrous; leaves broadly oblanceolate, 3-5 cm. long, entire, thin, green and glabrous on both sides, narrowed at base, acute at apex; paler but not glaucous beneath; stipules small; fertile catkins loosely flowered, the axis slightly villous, but not woolly; capsule glabrous, purplish, the pedicel $\frac{2}{3}$ to nearly as long as the body, and

about $1\frac{1}{2}$ times as long as the scale; style short or obsolete, stigmas short emarginate. Lower Fraser; Victoria. I have never succeeded in separating this species from *S. Mackenziana*, which at a certain stage of development sometimes simulates it.

32. *S. pyrifolia* Anders. Shrub, 1-3 m. high, twigs slender, glabrous, leaves ovate, lanceolate or obovate-oval, short-acuminate, rounded or cordate at base, 3.5-7 cm. long, 1.5-3.5 cm. wide, glandular-serrulate, thin, dark green on both sides, stipules ovate; catkins on short leafy peduncles, long, lax, the staminate 4-6 cm. long, filaments united for $\frac{1}{3}$ - $\frac{3}{4}$ their length; pistillate catkins 3-6 cm. long; capsules 3-4.5 mm. long, glabrous, on pedicels 2.5-4 mm. long, styles 0.5 mm. long. Mts. bordering northern Idaho (?).

33. *S. pseudomyrsinites* Anders. Shrub 1-3 m. high; twigs slender divaricate, glabrous, brown or chestnut; leaves elliptical-oblancoate to lanceolate oblong, apex acute, base usually rounded, 3-6 cm. long, glandular-serrulate to subentire, green on both sides, coarsely reticulated beneath, stipules large; catkins 2-3 cm. long; bracts thinly villous; pedicels 1-2 mm. long. Rockies; Valley of Chilliwick River.

2. POPULUS (POPLAR)

Trees with resinous buds covered by several scales, and broad leaves; diœcious catkins appearing before the leaves; flowers from a cup-shaped disk subtended by a fringed bract; stamens numerous, stigmas and styles 2-4, capsule 2-4-valved. (The Latin name).

Styles 2, stigmas narrow, petioles flattened.

Leaves white-tomentose beneath 1. *P. alba*.

Leaves smooth beneath.

Leaves 1 dm. broad 2. *P. vancouverensis*.

Leaves smaller 3. *P. tremuloides*.

Styles 2-4, stigmas dilated.

Petioles terete.

Leaves thick, end buds 12-18 mm. long 4. *P. trichocarpa*.

Leaves thin, end buds 22-25 mm. long 5. *P. balsamifera*.

Petioles flattened 6. *P. nigra italica*.

1. *P. alba* L. (SILVER-LEAVED POPLAR). A large tree with nearly smooth, light grey bark; leaves ovate, 5-lobed, irregularly dentate, becoming glabrate above; fertile catkins 3-4 cm. long, crenate, the bracts oblong, with a delicate fringe. A common, introd. shade tree, spreading freely by the root.

2. *P. vancouverensis* Trel. A large tree with thick crenate-serrate leaves, 1 dm. broad, or more. Sidney, V. I.; related to the following.

3. *P. tremuloides* Michx. (ASPEN). A tree 6-20 m. high, with smooth, grey-green bark, and glabrous bud-scales; leaves broader than long, subcordate or truncate at base, very short-acuminate, sometimes rounded at apex, glabrous, rather regularly toothed, 4-9 cm. broad; sterile catkins 4-8 cm. long, with a very slender rachis, the fertile longer; the bracts cut into 3-4 deep linear divisions, fringed with long hairs; capsule lanceolate. Widely distributed.

4. *P. trichocarpa* T. & G. (BLACK COTTONWOOD). A large tree 20-70 m. high, and often more than 1 m. diameter, with furrowed bark on old trees; leaves rhombic-ovate to ovate-cordate, margin crenate-serrate, silvery and usually rusty beneath, thick, leathery; sterile aments 5-10 cm. long, the fertile larger; the bracts lacinate-fringed, broad, deciduous, somewhat 3-lobed, slightly pubescent; stamens 25 or more; styles 3, capsule sub-globose, hairy. Alluvial lands and damp hillsides, Coast to Rockies in southern B.C.

5. *P. balsamifera* L. (BALM OF GILEAD). Similar; 25 m. high, with nearly smooth, grey bark, becoming furrowed on old trees; leaves truncate-ovate, finely crenate-serrate, shining above and silvery or rusty beneath, thinnish, but leathery; stamens 20-30, capsule ovoid. Northern B.C.

6. *P. nigra italica* Du Roi (LOMBARDY POPLAR). Branches vertical, and head therefore very narrow; leaves deltoid, broader than long; stamens purple; sterile catkins 4-7 cm. long, bracts lacinate. Introd., in cultivation.

MYRICACEÆ

Monœcious or diœcious shrubs with simple, alternate, aromatic leaves; the flowers in short, scaly, erect catkins; ovary, subtended by 2-8 bractlets, 1-celled with a single ovule, becoming a drupe-like nut.

1. MYRICA

Diœcious shrub (ours); flowers solitary under a scale-like bract with 2 bractlets, the sterile in cylindrical, the fertile in short, ovoid catkins, stamens 4-15; fruit resinous. (Greek *myrizein*, to perfume).

1. **M. Gale** L. (SWEET GALE). Shrub 1-1.5 m. high, with oblanceolate leaves, serrate towards apex, sterile catkins 2 cm. long, flowering before the leaves, closely clustered; the fertile 8 mm. long, nuts with thick wings at base. Lake-margins and swamps; widely diffused; Alaska to Wn.

BETULACEÆ

Monœcious trees or shrubs with alternate, pinnately veined leaves and deciduous stipules; staminate flowers in drooping catkins, the pistillate in clustered or spiked, usually shorter and more scaly catkins, fruit a 1-celled and 1-seeded nut or winged nutlet; ovary 2-celled, styles 2.

Fruit a nut enclosed in a leafy involucre; fertile catkin short, bud-like. 1. *Corylus*.

Fruit a small winged nutlet; fertile catkin elongated.

Stamens 2; scales of fertile catkins thin, 3-lobed, deciduous . . . 2. *Betula*.

Stamens 4; scales of fertile catkins thick, persistent . . . 3. *Alnus*.

1. CORYLUS (HAZEL)

Shrubs, growing in clumps; leaves thin, sharply doubly-toothed; flowers appearing before the leaves; sterile catkins pendulous, solitary, or in 2's or 3's; stamens 4 (apparently 8 with 1-celled anthers, owing to the deep divisions of the short filaments) fertile flowers few in a short, bud-like catkin, 2 to each bract, stigmas 2, red; nut enclosed in a very hispid involucre with a long, foliaceous beak.

1. **C. californica** Rose. Clumps, 2-8 m. high, branchlets hairy; leaves obovate, short-acuminate, rather plentifully pubescent beneath, sparingly so above, more or less cordate; nuts usually in clusters. Common, Vancouver; Arrowhead.

2. **C. rostrata** Ait. Clumps 1-2.5 m. high, leaves ovate or oval, sparingly pubescent beneath, at least on the veins. An eastern plant extending into eastern B.C.

2. BETULA (BIRCH)

Staminate catkins solitary or in pairs; in the axil of shield-shaped bracts about 3 flowers of 2 stamens with cleft filaments in a 4-toothed perianth with 2 bractlets; pistillate catkins solitary or in 2's or 3's, erect, the bracts usually puberulent, 3-lobed, perianth and bractlets wanting, styles 2; nutlets winged. (The Latin name).

Bark separable into layers.

Bark chalky-white, twigs pubescent but scarcely glandular . . . 1. *B. alba*.

Bark brownish or becoming silvery-grey or creamy-white

Twigs glabrous or slightly puberulent, leaves coarsely dentate-serrate . . . 2. *B. subcordata*.

Twigs glandular-warty.

Leaves broadly ovate, thinnish, with doubly serrate, often almost lobed, margins; twigs pubescent . . . 3. *B. occidentalis*.

Leaves deltoid, thick, coarsely dentate, twigs not pubescent. . . 4. *B. alaskana*.

Bark not separable into layers.

Low, 2 m. high; leaves 1-2.5 cm. long; samara wings not broader than the nutlets. . . 5. *B. glandulosa*.

Taller, leaves longer; samara wings as broad as, or broader than, the nutlets . . . 6. *B. fontinalis*.

1. **B. alba** L. (PAPER OR CANOE BIRCH). A shrub or small tree with white bark easily separable into layers; branchlets pubescent, resiniferous atoms, if present, mixed with long hairs; leaves oblong-ovate to ovate, taper-pointed, rounded to cuneate (or in var. *cordifolia* Fer. cordate) at base, 3-6 cm. long, glandular, pubescent on the veins beneath, sharply and unequally doubly serrate; fruiting spreading or drooping catkins 1.5-4.5 cm. long, the ciliate-margined scales 3-7 mm. long. Var. *papyrifera* (Marsh) Spach. Usually a larger tree with leaves 6-9 cm. long, middle lobe of bracts much longer than the lateral. Rare in southern B.C., reported from Field; Alaska and the Northern Rockies.

2. **B. subcordata** Rydb. A small tree with silvery-grey, purple-tinged or often dark bark, inner bark pale purple-brown to dark brown; twigs rarely with resinous glands; leaves dull green, thick, broadly ovate, acute, teeth spreading, usually sub-cordate; middle lobe of bracts longer than the lateral; wings of fruit broader than the elliptic nutlet. Kootenay.

3. **B. occidentalis** Hook. (WESTERN BIRCH). A small or large tree; bark grey, often becoming white, or brown on young trees; branchlets warty, glandular-hairy; leaves ovate to nearly orbicular, acute or short acuminate, rounded, truncate or sub-cordate at base, coarsely or irregularly doubly serrate or even slightly lobed; glandular and glabrous or pubescent beneath, 4-10 cm. long; petioles stout, glandular; fruiting aments 3-4 cm. long, 9-13 mm. thick; the middle lobe of the bracts longer than the broader lateral ones; nutlets elliptical to obovate, narrower than the wing. Rockies to Pacific; the common Birch west of the Cascades.

4. **B. alaskana** Sarg. (WHITE B.) About 10 m. high, twigs smooth, glandular; bark white to brown, usually brownish, not very readily separable into layers; leaves triangular-ovate to deltoid, long-acuminate, truncate to acutish at base, coarsely and irregularly serrate, somewhat hairy when young; petioles slender; the middle lobe of the bract not much longer than the lateral wings; broader than the small oval nutlet. Alaska to the Stikine.

5. **B. glandulosa** Michx. Low, 1-2 m. high; twigs warty, glabrous or puberulent; leaves thick, orbicular to obovate rounded at the apex, about 2 cm. long, often cuneate at base, serrate, glabrous, often resinous; fruiting catkins 1-2.5 cm. long; the middle lobe of the bracts not much longer than the lateral; nutlets orbicular. (*B. Hallii*) Cal. to Alaska and eastward. Common east of the Coast Range; low ground, Cranbrook.

6. **B. fontinalis** Sarg. (MOUNTAIN B.) In clumps, 4-8 m. high, or a small tree; bark reddish-brown with large lenticels often 2 cm. long; branchlets glandular, slender, somewhat pendulous; leaves 2-5 cm. long (or longer on young shoots) broadly ovate to suborbicular, apex acutish, base rounded or truncate, sharply, often doubly serrate, sparingly pubescent beneath; catkins 2-3 cm. long; 5-10 mm. thick; the middle lobe of the bracts much longer than the lateral. Along streams; common east of the Coast Range.

3. ALNUS (ALDER)

Staminate aments pendulous, 3 flowers in the axil of each bract consisting of a 3-5-parted perianth, and 3-5 stamens with 1 or 2 bractlets, the filaments simple; pistillate catkins erect, ovoid or ellipsoidal in fruit, 2 or 3 flowers in the axils of the bracts, which are wedge-obovate and become woody in fruit. (The Latin name).

Leaves simply serrate	1. <i>A. rhombifolia</i> .
Leaves doubly serrate.	
Peduncles longer than the fruiting catkins, flowers appearing with the leaves	2. <i>A. sitchensis</i> .
Peduncles shorter than the fruiting catkins, flowers appearing before the leaves.	
Shrubs, leaves thin, glabrous or nearly so, not revolute	3. <i>A. tenuifolia</i> .
Trees, leaves firm, pubescent beneath, revolute	4. <i>A. rubra</i> .

1. **A. rhombifolia** Nutt. (WHITE A.) A large tree, bark light-grey, or brown, breaking in rectangular flakes; leaves rhombic-ovate, to elliptical or obovate, usually acute at base and obtuse at apex; irregularly dentate-serrate; fruiting catkins 12-16 mm. long; nutlets not winged. East of Coast Range.

2. **A. sitchensis** (Regel) Sarg. (GREEN A.) A shrub, 5 m. high, or a small tree, with grey bark; leaves ovate, short-acuminate, or acute, rounded at the base, finely doubly-serrate, very gummy when young, thin; fruiting catkins 14-20 mm. long on slender peduncles, most of which are longer than the catkins; nutlets winged. (*A. viridis sinuata*) Coast and V. I. to Rockies and northward to Alaska.

3. **A. tenuifolia** Nutt. (MOUNTAIN A.) A shrub, 2-7 m. high, bark brown or grey; leaves broadly ovate, rounded or slightly cordate at base, sharply doubly-serrate, the teeth narrow, acute, thin, more or less woolly in the angles of the veins beneath; fruiting catkins 8-12 mm. long; nutlets winged. (*A. incana virescens*). Mt. streams throughout.

4. **A. rubra** Bong. (RED A.) A large tree with smooth, mottled grey bark; leaves elliptical, usually rounded at base and acute at apex, or sometimes acute at base, doubly-serrate, the teeth broad, often blunt, more or less revolute, veins and hairs beneath becoming rusty in drying; fruiting aments 12-24 mm. long, on stout peduncles; nutlets winged. (*A. oregona* Nutt.) Spence's Bridge to Coast, and V. I. Alaska.

FAGACEÆ (BEECH FAMILY)

Monœcious trees with alternate, pinnately veined leaves and deciduous stipules; the staminate flowers in drooping catkins, the pistillate in clusters; ovary 3-7-celled, becoming a 1-celled and 1-seeded nut enclosed partly in a cup of hard, consolidated bracts.

1. QUERCUS (OAK)

Sterile flowers in drooping catkins; calyx 2-8 lobed; stamens 5-10; fertile flowers solitary or clustered, enclosed in an involucre which becomes a cup; stigmas 3-lobed. (The Latin name).

1. **Q. Garryana** Dougl. A large tree, with gray, fissured bark, leaves 0.8-1.5 dm. long, pinnately lobed, the sinuses and usually the lobes rounded, puberulent above, closely pubescent beneath; stigmas short, dilated; acorn about 2 cm. long, pointed, in a scaly cup. Southern part of V. I.

URTICACEÆ (NETTLE FAMILY)

Herbs, shrubs, or trees with monœcious, perfect, or diœcious flowers, the leaves with usually deciduous stipules; calyx free from the 1-2-celled ovary; stamens as many as the lobes of the calyx and opposite them, or fewer.

Trees, flowers polygamous	1. Ulmus.
Twining herbs, flowers diœcious	2. Humulus.
Herbs, not twining, flowers monœcious (or rarely diœcious).	
Leaves opposite, with stinging hairs	3. Urtica.
Leaves alternate, without stinging hairs	4. Parietaria.

1. ULMUS (ELM)

Introduced trees; leaves alternate, serrate, unsymmetrical at base; styles or stigmas 2; calyx bell-shaped, 4-9 cleft; stamens 4-9, with long, slender filaments; fruit 1-seeded, winged all around.

1. **U. campestris** L. (ENGLISH ELM). Leaves very rough above; flowers nearly sessile; fruit orbicular, not ciliate. A shade tree. Var. **suberosa** Lond. Branches with corky bark, leaves rather small. Forms thickets, Cadboro Bay, Victoria.

2. **U. americana** L. (WHITE ELM). Leaves smooth above or nearly so; flowers on slender, drooping pedicels; fruit oval, ciliate-fringed. A common shade tree.

2. HUMULUS (HOP)

Sterile flowers in panicles, sepals and stamens 5; the fertile in catkin-like clusters with foliaceous bracts, each 2-flowered; the calyx of 1 sepal embracing the ovary. (The Latin name, dim. of *humus*, the ground, because sometimes prostrate).

1. **H. Lupulus** L. Leaves 3-5 lobed; the bracts of the fertile catkin producing yellow, resinous grains with characteristic aroma. A garden escape.

3. URTICA (NETTLE)

Flowers usually appearing in spikes or racemes; the sterile with 4 sepals, the 4 stamens inserted around the cup-shaped remnant of a pistil; the fertile with 4 sepals, the two outer smaller and spreading, the two inner concave, becoming membranaceous and enclosing the achene; stigma sessile, tufted. (Latin *urere*, to burn).

Leaves tomentose beneath	1. <i>U. holosericea</i> .
Leaves pubescent beneath	
Annual, fruiting clusters shorter than the petioles	2. <i>U. urens</i> .
Perennial, fruiting clusters longer than the petioles	
Leaves ovate	4. <i>U. Lyallii</i> .
Leaves lanceolate	3. <i>U. gracilis</i> .

1. **U. holosericea** Nutt. Stout, 1-2 m. high; leaves thick, oblong to ovate-lanceolate, on short, stout petioles, very coarsely serrate; the staminate panicles nearly equaling the leaves, the fertile shorter and denser. Valleys, S. E. Kootenay.

2. **U. urens** L. (SMALL NETTLE). Stout, 2-4 dm. high, with few stinging hairs; leaves nearly glabrous, elliptical or ovate, very coarsely serrate, the slender petiole nearly as long as the blade, inflorescence androgynous. Introd Victoria.

3. **U. gracilis** Ait. Slender, 0.5-2 m. high; sometimes grayish-pubescent; leaves 1-5 cm. broad, pointed, rounded at base or barely cordate, almost glabrous with relatively small teeth (25-35 on each side of the middle leaves); spikes slender and loosely paniced. Introd. eastward.

4. **U. Lyallii** Wats. (WESTERN NETTLE). Similar; leaves often 10-12 cm. broad, usually cordate, pubescent above, on the nerves beneath; teeth fewer and coarser, (15-23 on each side); the fruiting clusters equaling or longer than the petiole; the 2 large sepals quite enclosing the achene. The common coast form, also in interior.

4. PARIETARIA (PELLITORY)

Tufted herbs with staminate, pistillate and perfect flowers in the same involucre, cymose, axillary clusters; the sterile much as in *Urtica*, the fertile with a tubular 4-lobed calyx enclosing the ovary; leaves exstipulate; stigmas tufted.

1. **P. pennsylvanica** Muhl. Low, simple, or sparingly branched, minutely downy, annual; leaves oblong-lanceolate, roughish, with opaque dots; flowers shorter than the involucre. Shady rocky banks, S. E. Kootenay.

SANTALACEÆ (SANDALWOOD FAMILY)

Herbs with entire leaves; the inferior, 1-celled ovary surmounted by 4-5-lobed calyx; petals none; stamens 5, opposite the calyx-lobes; ovules several, fruit 1-seeded.

1. COMMANDRA (BASTARD TOAD-FLAX)

Low perennials with a somewhat woody base, from a rootstock; leaves sessile, exstipulate, alternate; flowers small, greenish, in small cymes or umbels; calyx lined with a disk, the lobes of which sometimes suggest small petals; anthers attached to the calyx by cobwebby hairs, whence the name. (Greek *kome*, hair, and *aner*, a man).

Inflorescence terminal, cymose, fruit nutlike.

Leaves dark-green on both sides	1. <i>C. Richardsiana</i> .
Leaves pale and glaucous.	2. <i>C. pallida</i> .
Inflorescence axillary, flowers solitary, fruit fleshy	3. <i>C. livida</i> .

1. *C. Richardsiana* Fer. Stems 1-2.5 dm. high, from a superficial rootstock; leaves oblong, lanceolate or oblanceolate, somewhat obtuse, the enlarged base of the calyx surmounting the fruit which is globose, 5-6 mm. in diameter. A root-parasite on various plants, throughout N. A. In beds of *Arctostaphylos uva-ursi*, Colwood, V. I.

2. *C. pallida* A. DC. Stems several at intervals from the rootstock, usually branched, leaves acute, oblong-linear, of the main stem often oblong; fruit an ovoid nut, 8-9 mm. in diameter, crowned by the short calyx tube. Gulch sides and dry hillsides, D. I.; Kamloops; Vernon.

3. *C. livida* Richards. Stems low; solitary, 1-2 dm. high; leaves ovate-elliptical; calyx-lobes ovate, often reddish within, the tube very short, not continued beyond the ovary; fruit pulpy when ripe, reddish-yellow, edible. Woods, Golden; Alaska.

ARISTOLOCHACEÆ (BIRTHWORT FAMILY)

Creeping herbs with perfect flowers, calyx large, purplish, partly coherent with the 6-celled capsule; stamens 12; leaves large, cordate. Represented by the genus *Asarum*.

1. *Asarum caudatum* Lindl. (WILD GINGER). Leaves 6-10 cm. broad, round-cordate, pubescent, ciliate, slightly crenate, a new pair produced each year; calyx-lobes with tails, 2-5 cm long. Woods; Goldstream; Comox, V. I.; Yale; Nelson; Armstrong.

POLYGONACEÆ (BUCKWHEAT FAMILY)

Herbs, base sometimes woody, with alternate, entire leaves, the stipules in the form of sheaths (ocreae) above the swollen joints of the stem, or none; flowers small, mostly perfect, with a more or less persistent calyx; petals wanting; stamens 4-9; styles 2 or 3; fruit a single achene.

Flowers involucrate, leaf-sheaths wanting, stamens 9 1. *Eriogonum*.

Flowers without involucre, sheaths present, stamens usually fewer.

Stigmas tufted.

Sepals 4, stigmas 2, achene orbicular-winged 2. *Oxyria*.

Sepals 6, often tuberculate, stigmas 3, achene 3-angled 3. *Rumex*.

Stigmas capitate, 2 or 3, achene lenticular or 3-angled 4. *Polygonum*.

1. ERIOGONUM

Tomentose herbs with a woody base producing short branches; inflorescence bracted, flowers subtended by a 5-8-toothed or-lobed involucre, the heads thus formed umbellate, capitate or solitary; petals none; calyx 6-parted, yellow, pink or white, persistent about the achene; stamens 9. (Greek *erion*, wool, and *gonu*, a knee).

Calyx attenuate to a stipe-like base.

Calyx pubescent.

- | | |
|---|----------------------------|
| Scape 5-8 cm. high; leaves glabrate above | 1. <i>E. androsaceum</i> . |
| Scape 1-2 dm. high; leaves more or less tomentose | 2. <i>E. flavum</i> . |

Calyx glabrous.

- | | |
|---|-----------------------------|
| Stems scapose; leaves short, spatulate-obovate. | 3. <i>E. umbellatum</i> . |
| Flowers yellow. | 4. <i>E. subalpinum</i> . |
| Flowers creamy | |
| Stems with a whorl of leaves near the middle; leaves long, narrow | 5. <i>E. heracleoides</i> . |

Calyx not attenuate to a stipe-like base.

Inner sepals narrower than the outer, calyx glabrous.

Involucres capitate or umbellate.

- | | |
|---|----------------------------|
| Calyx bright yellow or purplish; leaf blades about as broad as long | 6. <i>E. ovalifolium</i> . |
| Calyx ochroleucous; leaf blades longer than broad | 7. <i>E. ochroleucum</i> . |
| Involucres solitary, cymose, calyx white or rose. | 8. <i>E. niveum</i> . |
| Sepals similar, calyx somewhat pubescent, white or rose | 9. <i>E. multiceps</i> . |

1. *E. androsaceum* Benth. Tomentose, caudex branching; leaves oblanceolate or spatulate, glabrate above; umbel simple or subcapitate; calyx sparingly villous, yellow, 4-5 mm. long. Rockies; Bow River Pass.

2. *E. flavum* Nutt. Tomentose, the stems slightly so, the upper surfaces of the bracts and leaves greenish; 1-2 dm. high; the caudex branching and enlarged at the woody, slightly woolly summit; leaves obovate to oblanceolate; bracts several, leafy; rays of the umbel 1-2 cm. long, often shorter, each usually with several involucres; calyx light-yellow, densely pubescent below; stamens and stigmas slightly exserted; achene constricted at middle, villous at apex. Rockies, southward.

3. *E. umbellatum* Torr. Caudex much branched with short spreading or prostrate stems; scape 0.8-3 dm. high; leaves spatulate to obovate, merely pubescent or nearly glabrous above, white-tomentose below; umbel simple, the rays 1-2.5 cm. long, with many foliaceous bracts; involucres deeply lobed, the lobes becoming reflexed; flowers yellow. Crow's Nest Pass.

4. *E. subalpinum* Greene. Similar; scapes stouter, 3-4 dm. high; sepals creamy or ochroleucous, tinged with rose in age; inner sepals becoming rather longer after flowering, and finally surpassing the outer. (*E. umbellatum* var. *major* Benth.) Spence's Bridge; Rockies.

5. *E. heracleoides* Nutt. Caudex diffusely branched, stem 3-5 dm. high, usually with a whorl of leaves near the middle, where it often branches; bracts of umbel few; leaves linear-lanceolate, 3-8 cm. long, tomentose or glabrate above; involucre 6-8 cleft; calyx pale-yellow, usually becoming pink. Plains, D. I., Princeton, eastward.

6. *E. ovalifolium* Nutt. Densely white-tomentose with a short, closely branched caudex; leaves elliptical to orbicular, 7-20 mm. long, narrowed to a long slender petiole; bracts ternate, small; involucres capitate, on slender, erect peduncles, 5-20 cm. high. Plains South Kootenay; South Kootenay Pass. Var. *purpureum* (Nutt.) A. Nels. Flowers white, rose or purple. With the species.

7. *E. ochroleucum* Small. Similar; 1.5-2 dm. high, tufted from a large caudex; leaves obovate-spatulate, 1.5-2 cm. long, narrowed to the often twisted petiole; scapes slender, inflorescence globose; sepals yellowish-white. Near Glacier.

8. *E. niveum* Dougl. Densely white-tomentose; stems few and short; leaves oblong-ovate, 1-2 cm. long, petioled, scapes 1-2 dm. high, dichotomously branching, bracts in 3's, leafy involucres 6-9-flowered; flowers white or rose; glabrous. Plains and hillsides; D. I., Princeton, Summerland.

9. **E. multiceps** Nees. Densely white-tomentose, more or less tufted, the leaves basal, crowded, scapes simple, 3-12 cm. high; leaves spatulate or oblanceolate; involucre in a capitate cluster, with short, spatulate, foliaceous bracts; flowers white or rose, somewhat villous; stamens and stigmas exserted. South Kootenay Pass.

2. OXYRIA (MOUNTAIN SORREL)

Perennial alpine herb with long-petioled reniform leaves; flowers greenish, perfect, in narrow panicles, stamens 6. (Greek *oxys*, sour, from the leaves).

1. **O. digyna** (L.) Camptdera. Glabrous, leaves sour, slightly fleshy; 1-3 dm. high; fruit winged all around, 4 mm. long on filiform pedicels of about the same length. Common on mt. Summits; also in Alaska.

3. RUMEX (DOCK, SORREL)

Coarse perennials, the flowers somewhat whorled in panicles; stamens 6, sepals 6, the 3 outer herbaceous, spreading in fruit; the 3 inner (called valves) larger, usually colored, convergent over the 3-angled achene and often bearing a grain-like tubercle. (The ancient name).

Flowers dioecious, plants mostly 4 dm. tall or less, foliage acid.

Leaves with auricled or hastate leaves.

Leaves arrow-shaped at base

Leaves halberd-shaped at base

Leaves attenuate to the petiole

Flowers perfect or polygamous, plants coarse and tall, herbage not acid.

Valves spinulose on the margin.

Bristles of the valves subulate; 1 tubercle

Bristles of valves long and awnlike; 3 tubercles

Valves entire or denticulate.

Tubercles wanting.

Valves 2-3 cm. long

Valves 8-12 mm. long

Tubercle 1, small

Tubercles usually 3.

Valves 2-4 mm. wide, pedicels shorter or hardly longer.

Tufted, leaves about 1 cm. broad

Not tufted, leaves broader

Valves 4-6 mm. wide, pedicels longer.

Leaves with curled margins, pedicels clearly jointed

Leaves flat, pedicels obscurely jointed

1. *R. acetosa*.

2. *R. acetosella*.

3. *R. paucifolius*.

4. *R. obtusifolius*.

5. *R. maritimus*.

6. *R. venosus*.

7. *R. occidentalis*.

8. *R. patientia*.

9. *R. mexicanus*.

10. *R. conglomeratus*.

11. *R. crispus*.

12. *R. Britannica*.

1. **R. acetosa** L. (GARDEN S.) Erect, 3-6 dm. high; leaves oblong or lanceolate, 1-2.2 cm. wide, the basal lobes not spreading (sagittate); valves 4 mm. long, much exceeding the fruit; inner sepals becoming winged; achene smooth. Not common, introd., Victoria. Apparently indigenous at Lake Louise.

2. **R. acetosella** L. (COMMON S.) Lower, 1-3 dm. high; leaves lanceolate or oblanceolate, some of them with spreading lobes at base; valves hardly, if at all, exceeding the granular achene. A common weed.

3. **R. paucifolius** Nutt. Somewhat tufted, 2-5 dm. high; leaves lanceolate to oblanceolate, attenuate to a slender petiole, valves about 4 mm. broad, sometimes minutely tubercled, the inner sepals nor winged, much exceeding the small, smooth, achene. Prairies of the Rockies.

4. **R. obtusifolius** L. (BITTER DOCK). Tall, often roughish, perennial; the lowest leaves ovate-cordate, wavy or crisped; whorls not crowded; pedicels filiform, twice as long as the valves; valves 4-5 mm. long, usually with 1 well-developed grain, and traces of 2 smaller ones. Introd., Lulu Is., etc.

5. **R. maritimus** L. var. **fueginus** Dusen. (GOLDEN DOCK). Minutely puberulent, annual, 2-6 dm. high; diffusely branched; leaves lance-linear; to oblong, slightly crisped at rounded or cordate base; whorls much crowded, golden; grains 3, lanceolate. Includes most American references to *R. persicarioides* L. Fraser Delta. Common.

6. **R. venosus** Pursh. Stems from running rootstocks, about 3 dm. high; stipules dilated, conspicuous; leaves ovate to lanceolate, 8-15 cm. long, on short petioles; panicle short, valves obtuse, red, with a deep sinus. Sandy hills, Alberta to Wn.

7. **R. occidentalis** Wats. (WESTERN D.) Usually simple, 6-12 dm. high, whole plant often red; lowest leaves ovate to oblong, 1.5-3 dm. long, cordate; panicle dense, mostly rosy in fruit, leafless or nearly so; pedicels obscurely jointed, 1-3 times as long as the valves; valves 8-12 mm. long, cordate, obtuse. (*R. fenestratus* Greene). Common at Coast in marshes and extending far eastward.

8. **R. patientia** L. (PATIENCE D.) Tall, green, glabrous; the lowest leaves ovate-oblong, often very large; raceme dense; pedicels jointed, 2-4 times as long as the valves; valves 4-6 mm. wide; the grain not half as long, or reduced to a thickened midrib. *Var. kurdicus* Boiss. Grain conspicuous. Introd., Coast.

9. **R. mexicanus** Meisn. (TUFTED D.) Tufted, stems ascending, 3-6 dm. high; leaves lanceolate acute at both ends, hardly 1 dm. long, and usually 1-1.5 cm. broad; pedicels jointed, hardly longer than the valves; valves 3-4 mm. long, often nearly covered by the brown grains. (*R. salicifolius*). Shores V. I., and Coast; Rockies.

10. **R. conglomeratus** Murr. Stems solitary, 6-9 dm. high; leaves crisp-margined, oblong, rounded at base; panicle more or less leafy, the whorls often rather distant; pedicels hardly longer than the fruit, valves oblong, obtuse, about 2 mm. wide, grains relatively large. Wet places, Lulu Island; Victoria.

11. **R. crispus** L. (CURLD D.) Stems 6-9 dm. high; leaves with curled or wavy margins, lanceolate, the lower truncate at base; whorls crowded, leafless above; pedicels with tumid joints; valves 4-6 mm. broad, mostly all grain-bearing; grains plump, often rosy. Common. (**R. elongatus** Guss. Similar; grains lance-ovoid, acute, may also occur).

12. **R. Britannica** L. Tall and stout; leaves oblong-lanceolate, rather acute at both ends, 2-3 dm. long, 2-5 cm. broad, the margins obscurely erose-crenulate; racemes nearly leafless; whorls crowded; valves 4-6 mm. broad, cordate, obtuse, finely reticulated, all grain-bearing, the grain lanceolate. Lower Fraser, introd.

4. POLYGONUM (KNOT WEED)

Herbs, sometimes shrubby, annual or perennial, sometimes aquatic; leaves alternate, entire, with sheathing stipules; flowers small, perfect, axillary or in spikes; calyx 4-6 (mostly 5)-parted, the divisions often colored; stamens 3-9, stigmas 2 or 3, achenes lenticular or triangular. (Greek *poly*, many, *gonu*, a knee, from the numerous joints of the stem).

Stems twining.

Outer fruiting sepals keeled 1. *P. convolvulus*.
Outer fruiting sepals winged 2. *P. scandens*.

Stem not twining.

Leaves linear or small, (Flowers axillary or in leafy or interrupted spikes, the 3 inner filaments dilated at the base, leaf blades jointed on the petioles).

Leaves ovate to oval.

Fruit reflexed 8. *P. Austinæ*.

Fruit erect.

Leaves less than 1 cm. long 12. *P. minimum*.

Leaves 1-4 cm. long 6. *P. erectum*.

Leaves narrow, oblong to linear.

Plants prostrate.

Perennial, with a woody base 3. *P. paronychia*.

Annual, roots filiform.

Achene exceeding the calyx 4. *P. Fowleri*.

Achene not exceeding the calyx 5. *P. aviculare*.

Plants erect or ascending.

Fruit reflexed.

Calyx 1.5-2 mm. long, achenes exserted 7. *P. Engelmannii*.

Calyx 3-4.5 mm. long, achenes included 9. *P. Douglasii*.

Fruit erect.

Inflorescence axillary, stems rather stout 10. *P. ramosissimum*.

Inflorescence racemose-spicate, stem slender.

Inflorescence capitate 11. *P. confertiflorum*.

Inflorescence longer, interrupted

Calyx 1.2-2 mm. long, stem red filiform 13. *P. Nutallii*.

Calyx 2-3.5 mm. long, stem green, slender 14. *P. spargulariaeforme*.

Leaves large; spike thick, terminal.

Alpine, plants with a thick rootstock, sheaths naked.

Spike solitary.

Spike bulb-bearing, rootstock corn-like 15. *P. viviparum*.

Spike rarely bulb-bearing, rootstock elongated 16. *P. bistortoides*.

Spikes several, panicle 17. *P. alpinum*.

Not alpine, without a thick caudex.

Sheaths not fringed with bristles.

Spikes solitary, or in pairs.

Sheaths with a foliaceous border 18a. *P. amphibium*, var. *Hartwrightii*.

Sheaths without a foliaceous border.

Leaves oblong, rounded at base 18. *P. amphibium*.

Leaves lanceolate, acute at base 19. *P. Muhlenbergii*.

Spikes several.

Achenes 2.5 mm. broad; leaves floccose beneath 20. *P. tomentosum*.

Achenes 1.5 mm. broad, leaves rough on midrib beneath 21. *P. lapathifolium*.

Sheaths fringed with fine bristles.

Calyx dotted with dark glands.

Achene dull 22. *P. hydropiper*.

Achene shining 23. *P. acre*.

Calyx not dotted.

Annual, sheaths smooth, spikes thick 24. *P. Persicaria*.

Perennial, sheaths hairy, spikes slender 25. *P. hydropiperoides*.

1. *P. convolvulus* L. (BINDWEED). Annual, stem twining or procumbent, 3-9 dm. long, minutely roughish; leaves halberd-heart-shaped, pointed; flowers greenish, in small racemes, the outer calyx-lobes merely keeled; achene minutely roughened. Common.

2. *P. scandens* L. Perennial, stems often very long, smooth, leaves and flowers much as in the preceding; racemes leafy; the 3 outer calyx-lobes keeled, becoming broadly winged in fruit; achene shining. South East Kootenay.

3. *P. paronychia* C. & S. The brown, shrubby stems forming mats; leaves strongly revolute, narrowly oblanceolate with a very broad scabrous midrib; sheaths silvery, soon lacerate; flowers pinkish, axillary or in subcapitate clusters; achene shining, included. Clay cliffs, Victoria.

4. *P. Fowleri* Rob. Similar to the following; prostrate, pale-green leaves narrowly elliptical, sepals oblong, green, with narrow white or pink margins, two-thirds as long as the achene. Coast Wn. to Alaska; Comox.

5. *P. aviculare* L. Stems prostrate forming mats; leaves oblong to oblanceolate, 1.5-2.5 cm. long, acutish, nearly or quite entire, bluish green; sheaths becoming brown; sepals green with narrow, pink margins, 2 mm. long, closely and usually completely enclosing the minutely roughened, dull achene; stamens 5-8. Common. Var. *littorale* Koch. Leaves thickish, often obtuse, sometimes slightly crisped; nodes generally red. Salt marshes, Vancouver. Var. *vegetum* Ledeb. Larger, erect or nearly so; leaves often 3 cm. long, thin, with crisped margins. Nanaimo; Comox.

6. *P. erectum* L. Erect or spreading, stems glabrous, yellowish-green, rather stout, 2-5 dm. high; leaves more than twice as long as broad, mostly obtuse; sheaths 6 mm. long or more; flowers axillary, yellowish-green, 3 mm. long, somewhat pediceled; stamens 6-7; achenes dull. Banff.

7. *P. Engelmannii* Greene. Slender, wiry, somewhat scurfy annual, branching from the base, 5-15 cm. high; leaves linear-lanceolate; flowers 2-4 in the axils; sepals 2 mm. long, green, scarious-margined; stamens 5-8, styles 3, achene oblong, shining. Sandy soil, S. E. Kootenay.

8. **P. Austinæ** Greene. Glabrous except for the slightly scurfy-glandular erect stem, 2-10 cm. high, branching from base; leaves 4-9 mm. long, lanceolate to ovate or elliptical, acute or with a short, acute point, flowers in small clusters in the axils of leaves which are much reduced above; fruit reflexed, calyx 2 mm. long, achene dull, slightly exserted, acute at both ends. Rockies; Lake Louise.

9. **P. Douglasii** Greene. Glabrous, except sometimes at the nodes, 2-4 dm. high; usually erect, with erect or ascending, somewhat angled branches; leaves linear-lanceolate, 2-5 cm. long, often revolute, glaucous beneath, much reduced above; sheaths with a few long bristles; flowers from few and distant to loosely spicate; bracts small, subulate; calyx with white or pink margins; stamens 8, styles 3, achene shining. Common, D. I.; Near Duncan, V. I. Var. **montanum** Small. Angles of stem minutely scabrous; often floriferous from the base; bracts lanceolate foliaceous. Alberta to Wn. probably in S. E. Kootenay.

10. **P. ramosissimum** Michx. Stem erect, 3-10 dm. high; yellowish-green, branches terete, leaves narrowly lanceolate, 2-5 cm. long; flowers short-pedicelled, in small axillary clusters; sepals usually 6, roseate, often yellowish, the 3 outer carinate, cucullate at the apex; stamens 3-6; styles 3, achene smooth, shining, included. Temperate North America. The usual Western form is forma *atlantica* Rob. Sepals 5, red-margined.

11. **P. confertiflorum** Nutt. Low, slender, 3-15 cm. high, nearly or quite smooth; leaves linear, 1-3 cm. long; bracts sometimes scarious-margined; calyx 2 mm. long, more or less rose-colored; sepals ovate; stamens 3-5; flowers crowded, or with straggling axillary ones below; achene narrowly ovoid, minutely granular. (*P. Watsoni*). Alberta to Wn. Perhaps in Kootenay.

12. **P. minimum** Wats. Stem slender, erect or spreading, 1-2.5 dm. high, red, minutely rough to smooth; leaves mucronate, obtuse or somewhat acute, less than twice as long as basal; sheaths 2-3 mm. long; flowers sessile, 1-3 in the axils; calyx green or red, 1.5-2 mm. long; stamens 5-8; fruit erect, achenes shining. Dry hillsides, Cameron Lake, V. I.; Mt. Cheam; Mt. Revelstoke.

13. **P. Nuttallii**. Small like *P. minimum* but with longer and narrower leaves; glabrous, erect, 1-3 dm. high; stems red, leaves linear-lanceolate, 1-2 cm. long, glaucescent beneath, somewhat revolute, sheaths 2-4 mm. long, at length lacerate; flowers axillary and in crowded green-bracted spikes; sepals pink-margined, small; stamens 8 or fewer; achenes 3-angled, included, shining, the faces rather strongly concave. (*P. intermedium* Nutt.) Mt. Mark, V. I.; Hope.

14. **P. spergulariæforme** Meisn. Minutely puberulent to glabrous, branching from the base, erect, or the branches widely spreading, leaves revolute, 1-2 cm. long; sheaths 5-6 mm. long, soon lacerate; flowers axillary and in terminal, green-bracted, rather dense racemes; calyx pink, with green usually branching midribs, style 3-parted nearly to the base, stamens 5-8. Gravel and dry hillsides, V. I. to the Columbia, Mayne Is.; Crescent. **P. lineare** Hook. More prostrate, often widely branching, inflorescence loose, sepals rose-red, some of them narrower than the others. Duncan, V. I.

15. **P. viviparum** L. Glabrous, 1.5-3 dm. high; leaves rounded, acute or sub-cordate at base, oblong-lanceolate, (the radical broader), glaucous beneath, the lower long petioled; spike less than 1 cm. thick, bulblet-bearing at the base or throughout; calyx rose to white; bracts scarious, brownish; styles exserted. Mt. Cheam; Rockies and northward.

16. **P. bistortoides** Pursh. Similar; 2-5 dm. high; leaves acute or obtuse at both ends, spike more than 1 cm. broad, not usually bulb-bearing. Rockies northward.

17. *P. alpinum* var. *alaskanum* Small. Perennial from a stout root-stock, 3-9 dm. high; leaves pubescent, ovate-lanceolate, 1-2.5 dm. long, obtuse or cordate at base; sheaths 2-3 cm. long, more or less hispid; spikes loosely-flowered, 2-5 cm. long; calyx greenish or white, 2-3 mm. long; stamens 8. Wn. to Alaska in the mts.

18. *P. amphibium* L. Aquatic or in wet places, glabrous; leaves rounded or sub-cordate at the base, obtuse or acute at the apex, narrowly elliptical or oblong, 1 dm. long or less, sometimes long petioled; spike ovoid or short-cylindrical, 1.5 cm. thick, about 2 cm. long; calyx bright-rose. Victoria, Kootenay. Var. *Hartwrightii* (Gray) Bissell. Stems hirsute, plants often sterile. Kamloops; Vancouver.

19. *P. Muhlenbergii* (Meisn.) Wats. In muddy or dry places; pubescence short-appressed; leaves short-petioled to sessile above, 1.5-2 dm. long, spikes 1 cm. thick, 3 cm. or more long on usually glandular peduncles; calyx bright rose. Lulu Is., Columbia Valley and eastward. Variable; sometimes glabrous or with cordate leaves.

20. *P. tomentosum* Schrank. Annual, 1-5 dm. high; leaves lanceolate or lance-oblong, at least somewhat tomentose on the under surface; spikes thickish, the lateral nearly sessile, stamens 6, flowers white or pale-pink; styles 2. Near Victoria.

21. *P. lapathifolium* L. Annual, 2-6 dm. high; glabrous or the peduncles somewhat glandular; leaves more or less punctate, lanceolate, attenuate upwards from near the cuneate base, with short, scabrous appressed hairs on midrib and margin; spikes dense, somewhat paniced, erect or nodding; flowers white or rose, stamens 6, achene shining, usually flattened. In most parts of North America. Var. *incanum* Koch. Low, leaves tomentose beneath, Kootenay. Var. *nodosum* Weinm. Stems stout, spotted with red dots, spikes erect, not slender. Introd. Steveston; Port Moody; Columbia Valley.

22. *P. hydropiper* L. (SMARTWEED). Annual, 3-9 dm. high; leaves narrowly lanceolate with minutely bristly-ciliate margins, very acrid; spikes nodding in fruit, usually interrupted, 5 mm. thick; flowers greenish, the sepals slightly pink at the tips, stamens 6; style 2-3-parted; achenes dull. Wet places, common at the Coast and eastward.

23. *P. acre* H. B. K. (WATER SMARTWEED). Perennial, nearly smooth, the stem rooting at the decumbent base, 3-12 dm. high, leaves with short-appressed hairs on the midrib and margin, lanceolate, attenuate upwards from near the base; spikes erect, rather loose, 1.5-5 cm. long, 5 mm. thick; stamens 8, style mostly 3-parted; achene small, shining. Wet places. Agassiz; Kamloops; New Westminster.

24. *P. Persicaria* L. (LADY'S THUMB). Stems glabrous or nearly so, 3-5 dm. high; leaves lanceolate, usually with a triangular dark spot near the middle, finely-bristly-ciliate, minutely roughened beneath; spikes dense, 1 cm. thick, styles mostly 2-parted, and achene flattened, smooth and shining. A common garden weed.

25. *P. hydropiperoides* Michx. (MILD WATER-PEPPER). Perennial, not acrid; stem smooth, 3-9 dm. high; leaves narrowly lanceolate; spikes erect, slender, 3-6 cm. long, flowers small, red or white, stamens 8, styles 3, achenes sharply triangular, smooth and shining. Elk Lake, Victoria; throughout N.A.

CHENOPODIACEÆ (GOOSEFOOT FAMILY)

Herbs, often white-mealy; flowers sessile, in axillary or terminal clusters, or in spikelets; calyx 2-5-parted, usually small, green; stamens 5, sometimes 1-2; styles 2; fruit a utricle; embryo a ring about the albumen.

Leaves reduced to scales, stems fleshy, jointed	1. <i>Salicornia</i> .
Leaves linear or subulate, stems not jointed.	
Leaves spiny, embryo spiral.	2. <i>Salsola</i> .
Leaves not spiny.	
Embryo a flat spiral, albumen scanty or none; calyx 5-parted.	3. <i>Suæda</i> .
Embryo annular about the copious albumen; sepal one	4. <i>Corispermum</i> .
Leaves broad, lanceolate to ovate, embryo annular.	
Sepals 1, stamen 1, fruit reticulated.	5. <i>Monolepis</i> .
Calyx-lobes of staminate flowers 3-5, stamens usually 5	
Flowers perfect, fruit without bracts	6. <i>Chenopodium</i> .
Flowers monœcious or diœcious; fruit enclosed by 2 enlarged bracts	7. <i>Atriplex</i> .

1. SALICORNIA (GLASSWORT)

Fleshy herbs, the leaves reduced to pairs of scales; flowers perfect, sunk 3 together in the upper axils and forming a spike; stamens 1 or 2; seeds without albumen. (Latin *sal*, salt, *cornu*, a horn. Saline plants with horn-like branches).

1. *S. ambigua* Michx. Perennial from a woody base, 1.5-4 dm. high; stems green, becoming lead color, with mostly simple branches above, scales short, obtuse; all 3 flowers on nearly the same level, and equaling the joint; spike blunt. Sea shores and salt marshes, V. I.; Vancouver.

2. *S. europœa* L. Annual, slender, 1-4 dm. high; stems green, often turning red, much branched; the fruiting spikes on slender branches; scales obscure; the middle flower higher than the 2 lateral ones, shorter than the joint. Alkaline places, D. I.; Kamloops; Nicola.

2. SALSOLA (RUSSIAN THISTLE)

A bushy annual with fleshy or spiny leaves and sessile axillary flowers; calyx 5-parted, the fruiting segments horizontally winged, their acuminate tips convergent; seed without albumen. (Latin dim. of *salsus*, salty; from the habitat.)

1. *S. kali* L. var. *tenuifolia* Meyer. Leaves prickly-pointed, awl-shaped or, especially in young plants, some of them linear, 2-7 cm. long. Introd. D. I.

3. SUÆDA (SEA BLITE)

Fleshy, saline plants, with thick, linear leaves, and clustered, sessile flowers in the axils; flowers perfect, stamens 5, styles 2; calyx 5-parted, the segments fleshy, flat, keeled or sometimes crested; fruit flattened, not thin-edged; embryo a flat spiral; albumen scanty.

1. *S. depressa* (Pursh). Wats. Decumbent or erect; leaves broadest at the dilated base, 1-4 cm. long, the floral lanceolate to ovate; one or more of the sepals crested in fruit. Alkaline soil, Spence's Bridge; Wn. to Atlantic.

2. *S. maritima* (L.) Dumort. Glaucous, ascending or depressed, 1-5 dm. high; leaves linear, not broadened at base, 5 cm. long or less; sepals rounded or obscurely keeled on back. Salt Marsh, Crescent. As the Crescent plants are erect and have only 1-3 stamens instead of 5, one or two of the sepals hooded (but not keeled), and seeds hardly 1.5 mm. broad, they are very doubtfully referred to this species, which, however, also occurs on the Wn. coast. There are two forms (a) floral leaves spreading-ascending; (b) floral leaves erect, slightly thinner.

4. CORISPERMUM (BUG SEED)

Annual; flowers perfect in the upper axils of reduced leaves; calyx of a single delicate sepal; stamens 1 or 2, rarely 5; margins of the ellipsoidal utricle acute or winged. (Greek *coris*, a bug, *sperma*, a seed).

1. *C. hyssopifolium* L. Pale-green, branching, 2-3 dm. high, more or less villous-pubescent; leaves cuspidate, 1.5-3 cm. long, reduced abruptly to the floral bracts. Spence's Bridge.

5. MONOLEPIS

Rather low branching herbs with perfect or polygamous flowers in small axillary clusters; calyx a single herbaceous sepal; seeds vertical, flattened, pericarp persistent, embryo a nearly complete ring. (Greek *monos*, one, *lepis*, a scale).

1. *M. Nuttalliana* (R & S.) Greene. Glabrous or somewhat mealy, much branched from the base, 1-3 dm. high; leaves hastate-lanceolate with 2 acute spreading basal lobes, or the upper entire, attenuate to the petiole; flower-clusters often reddish; pericarp minutely pitted. (*M. chenopodioides*). Open fields, Laggan; Creston.

6. CHENOPODIUM (GOOSEFOOT)

Usually more or less white-mealy, with alternate leaves and small sessile flowers in axillary or spicate clusters; calyx mostly 5-cleft; stamens mostly 5. (Greek *chen*, a goose, *pous*, a foot; from the shape of the leaves).

Stamens 1 or 2; seeds vertical and horizontal in the same inflorescence; sepals not keeled.

Clusters in leafy spikes; seeds 1 mm. broad 1. *C. rubrum*.

Clusters axillary; seeds 0.5 mm. broad 2. *C. humile*.

Stamens 5.

Calyx very fleshy; seeds all vertical; fruiting clusters strawberry like 3. *C. capitatum*.

Calyx slightly or not at all fleshy, seeds horizontal except in Nos. 5 and 7.

Leaves white-mealy, at least beneath.

Leaves linear, entire 4. *C. leptophyllum*.

Leaves not linear.

Sepals strongly keeled in fruit, plants tall, erect 6. *C. album*.

Sepals not keeled in fruit, plants low, spreading 5. *C. glaucum*.

Leaves slightly or not at all mealy.

Glandular-pubescent, leaves pinnately lobed 7. *C. Botrys*.

Not glandular, leaves not pinnate.

Seed easily separable from the pericarp 8. *C. Fremontii*.

Seed closely attached to the pericarp.

Leaves with 1-4 large teeth, mostly abrupt or cordate at base. 9. *C. hybridum*.

Leaves dentate or serrate, mostly cuneate at the base.

Seeds dull, the margins sharp-edged 10. *C. murale*.

Seeds shining, the margins rounded 11. *C. urbicum*.

1. *C. rubrum* L. Stout, leaves thick, triangular-hastate to ovate, the base somewhat cuneate, sparingly and coarsely toothed; clusters scattered in axillary, leafy spikes; sepals not keeled, 2-5, somewhat red and fleshy; seed 1 mm. broad, shining, separating from pericarp, the margin acute. Saline or alkaline soil. Coast and interior. Vancouver; Kicking Horse Valley; Straits of Jaun de Fuca.

2. *C. humile* Hook. Similar; low prostrate or ascending, leaves often entire, only occasionally hastate; flowers in axillary glomerules; seed 0.5 mm. broad. On dry mud, Kamloops.

3. *C. capitatum* B. & H. (STRAWBERRY BLITE). Usually branching from the base, 2-4 dm. high; leaves triangular-hastate to lanceolate, sinuate-toothed; clusters large, often in pairs, interruptedly spiked, the upper leafless; seed acutely margined, readily separating from the pericarp. Creston: northward to Alaska.

4. **C. leptophyllum** Nutt. Densely mealy, the leaves sometimes glabrate and green above; stems 2-6 dm. high, often simple; the flowers clustered in dense or interrupted spikes; sepals carinate. Spence's Bridge.

5. **C. glaucum** L. Low, succulent, spreading or prostrate; leaves mealy beneath, green above, ovate, sinuate-dentate; clusters in axillary, often branched, spikes shorter than the leaves; seeds vertical and horizontal. Common on the plains of Alberta. Introd. along the C. P. R.

6. **C. album** L. (LAMB'S QUARTERS). Tall and stout garden weed; leaves mealy beneath, rhombic ovate to lanceolate, at least the lower dentate; clusters spiked, mostly dense; calyx-lobes carinate, covering the shining seed which closely adheres to the pericarp. Common.

Var. **viride** (L.) Mog. Leaves slightly mealy, inflorescence less dense. With the species.

7. **C. Botrys** L. (JERUSALEM OAK). Glandular-pubescent and viscid; strong scented, 2-5 dm. high; leaves green, oblong, obtuse, pinnatifid; racemes cyme-like, leafless; the ring of the embryo incomplete; seeds often vertical, small. Spence's Bridge.

8. **C. Fremontii** Wats. Erect, green, sparsely mealy, slender; leaves triangular-hastate, 7-20 mm. long, truncate or cuneate at base, sinuate-dentate to entire; spikes in an open terminal panicle and axillary; sepals keeled, about covering the easily separable seed. Kamloops.

9. **C. hybridum** L. (MAPLE-LEAVED GOOSEFOOT). Green and glabrous throughout, branching, 4-8 dm. high; leaves thin, 3-10 cm. long, triangular, often cordate or truncate at base, the teeth 1-2 cm. long, racemes diffusely paniced; calyx not fully covering the fruit, its lobes keeled. Introd. Victoria and along the railways.

10. **C. murale** L. Scarcely mealy, erect or decumbent, 3-6 dm. high; leafy to the summit, leaves ovate, coarsely and unequally toothed, broadly cuneate at base; panicles shorter than the leaves, the spikes divergent; calyx-lobes hardly keeled, not entirely covering the fruit. Introd. Victoria; Nanaimo.

11. **C. urbicum** L. Green, slightly mealy, with erect branches, 3-9 dm. high; leaves triangular, acute, irregularly and sharply many-toothed or nearly entire, the spikes erect, crowded in long, narrow panicles; calyx-lobes not keeled. Introd. Victoria; Nanaimo.

7. ATRIPLEX (ORACH)

Herbs with more or less scurfy or mealy leaves and monœcious or diœcious flowers, the 2 kinds of flowers in separate plants or together; the fertile consisting of a naked pistil with 2 stigmas enclosed between 2 bracts which enlarge in fruit; seeds vertical; embryo a ring about the mealy albumen.

Shrubby with white bark	1. <i>A. Nuttallii</i> .
Herbaceous.	
Leaves densely silvery—scurfy	2. <i>A. argentea</i> .
Leaves green, more or less scurfy.	
Fruiting bracts linear	3. <i>A. zosteræfolia</i> .
Fruiting bracts deltoid	4. <i>A. patula</i> .

1. **A. Nuttallii** Wats. Erect, 3-9 dm. high, scurfy; leaves oblong to oblanceolate, entire, apex acutish or obtuse; clusters in terminal spikes and axillary; flowers often diœcious; fruiting bracts coarsely toothed. Saline soil. Plains of N. W. to Wn.

2. **A. argentea** Nutt. Stems 2-4 dm. high, simple or branching, leaves triangular-hastate to lanceolate, acute or somewhat obtuse, entire; clusters axillary or in short spikes; fruiting bracts united at base, coarsely toothed. Summerland.

3. *A. zosteræfolia* Wats. Weak and slender, 3. dm. high or less, glabrous or slightly scurfy; leaves linear, 3 mm. wide; clusters axillary and in short androgynous spikes; bracts linear, free. Col. by Scouler, Straits of De Fuca, not seen since.

4. *A. patula* L. Erect or prostrate, 3-9 dm. high, glabrous or somewhat scurfy; leaves lanceolate-hastate, mostly entire, clusters in terminal spikes; fruiting bracts ovate-deltoid, usually entire, with a sharp tooth near the base, usually tubercular-muricate on the back. Shores, Gulf of Georgia. Var. *hastata* (L.) Gray. Stout, at least the lower leaves broadly triangular-hastate often obtuse and coarsely toothed. Vancouver; Victoria.

Var. *littoralis* (L.) Gray. Slender, leaves linear-lanceolate to linear rarely sub-hastate or toothed. V. I.; Vancouver.

LORANTHACEÆ (MISTLETOE FAMILY)

Parasitic, yellowish plants, growing on trees; leaves opposite; flowers diœcious (in ours) calyx-tube adnate, with a toothed limb; stamens 2-6; ovary solitary, seed 1.

1. ARCEUTHOBIUM (SMALL MISTLETOE)

Small, fleshy plants with 4-angled stems, flowers crowded towards the ends of the branches; leaves scale-like; pistillate calyx 2-toothed, the staminate 2-5-parted; stamens 2-5, anthers 1-celled; fruit a berry. (Greek *arkenthos*, the juniper, *bios*, life).

1. *A. americanum* Nutt. Greenish-yellow, the staminate plants 5-10 cm. long, the pistillate smaller; branching freely, flowers 1-2 mm. wide, the staminate paniculate, berries on pedicels; growing on *Pinus contorta*. Golden; Princeton.

2. *A. campylopodum* Engelm. Growing on *Pinus ponderosa*, often forming large clusters; staminate plants yellow, the flowers mostly, axillary; 5-12 cm. long; the pistillate olivaceous. Known as "Snappers," owing to the explosive fruit. Columbia Valley.

3. *A. Douglasii* Engelm. Stems short, 1-4 cm. high, greenish-yellow, much branched, staminate flowers 1.5 mm. wide, axillary, forming simple or compound spikes. Growing on Hemlock (*Tsuga heterophylla*), forming "Witches Brooms." (*A. Douglasii Tsugensis* Piper). West Coast, V. I.; Harrison.

AMARANTHACEÆ (AMARANTH FAMILY)

Characteristics much as in the Chenopodiaceæ, but the leaves are not mealy and the flowers are 3-bracted, the bracts scarious, persistent.

1. AMARANTHUS (AMARANTH PIGWEED)

Coarse annuals, with entire, bristle-tipped leaves, and monoœcious or polygamous flowers; calyx 3-or 5-cleft; stamens mostly 5; fruit a utricle; embryo a ring about the albumen. (Greek *amaranthus*, unfading).

Stamens and sepals 5, flowers in dense spikes.

Spikes 8-14 mm. thick

Spikes 4-6 mm. thick

Stamens and sepals 3-5, flowers in small axillary clusters

Stems erect or ascending

Stems prostrate

1. *A. retroflexus*.

2. *A. paniculatus*.

3. *A. græcizans*.

4. *A. biitoides*.

1. *A. retroflexus* L. (GREEN A. PIGWEED). Rough-puberulent, 3-9 dm. high; leaves ovate, margins more or less undulate, acute at base, petioles half as long as the blades; bracts awn-pointed, exceeding the obtuse or acute sepals; the thick spikes crowded in a stiff glomerate panicle. A common weed.

2. *A. paniculatus* L. (PURPLE A.) Stem mostly pubescent; leaves oblong-ovate; spikes long, slender, paniced; bracts awn-pointed; flowers green, tinged with red, or crimson; fruit 2-3-toothed at the apex. Introd. Sicamous.

3. *A. græcizans* L. (TUMBLE WEED). Glabrous stems whitish, much branched; leaves small, 1-3 cm. long, obovate; bracts subulate, rigid, pungently pointed; sepals 3, acuminate, half the length of the rugose utricle; seed less than 1 mm. broad. (*A. albus* L.) A common weed, D. I.

4. *A. blitoides* Wats. Similar but prostrate or decumbent; spikelets contracted; bracts ovate-oblong, short-acuminate; sepals 3-5, obtuse or acute; fruit not rugose; seed 1.5 mm. broad. Departure Bay; D. I.

NYCTAGINACEÆ (FOUR-O'CLOCK FAMILY)

Herbs with opposite, entire leaves and rather showy, perfect flowers; calyx tubular and colored; ovary 1-celled, 1-seeded; fruit coriaceous, enclosing an achene.

1. ABRONIA

Prostrate, from large roots; leaves thick; flowers in clusters, subtended by an involucre; calyx salver-form, fruit 3-5 winged. (Greek *abros*, graceful; may apply to some species).

1. *A. latifolia* Esch. Viscid, stout, 3-6 dm. long; leaves ovate to reniform, petioles stout; bracts ovate; calyx yellow, about 12 mm. long. Sand, shores of Cadboro Bay.

2. *A. umbellata* Lam. Viscid, slender, 3-9 dm. long; leaves ovate to narrowly oblong, petioles slender; bracts narrowly lanceolate; calyx rose-colored, 12-15 mm. long; wings of the fruit coriaceous, not completely encircling the body. Sand; Pachene Bay, V. I.

CARYOPHYLLACEÆ (PINK FAMILY)

Herbs with opposite entire leaves and symmetrical 4-5 merous flowers, sometimes apetalous; stamens 10 or fewer; styles 2-5, ovary superior, 1-celled, with free central or basal placentation; the embryo coiled around the albumen.

Sepals distinct or nearly so, petals when present without claws.

Stipules present.

Styles 3, leaves opposite

Styles 5, leaves whorled

Stipules wanting.

Styles alternate with the sepals, petals entire

Styles opposite the sepals, or if less than 5, opposite the exterior sepals.

Petals entire

Petals bifid or sometimes wanting.

Styles 4-5, pod cylindrical, more or less curved.

Styles 3, pod ovoid or oblong, not curved

Sepals united into a tube, petals long-clawed.

Calyx with bracts at base

Calyx naked.

Calyx 10-many-nerved, styles 3 or 5.

Styles 3, rarely 4 or 5, capsule with 3 or 6 teeth

Styles 5, capsule with 5 or 10 teeth.

Calyx-teeth foliaceous, alternate with the styles.

Calyx-teeth short, opposite the styles

Calyx obscurely nerved, styles 2

1. *Spergularia*.

2. *Spergula*.

3. *Sagina*.

4. *Arenaria*.

5. *Cerastium*.

6. *Stellaria*.

7. *Dianthus*.

8. *Silene*.

9. *Agrostemma*.

10. *Lychnis*.

11. *Saponaria*.

1. SPERGULARIA (SAND SPURREY)

Low herbs often of saline habitat, the opposite leaves often with smaller ones in the axils; petals 5 entire; stamens 2-10; styles and valves of capsule mostly 3. (*Tissa* and *Buda* Adam).

Leaves not fleshy; stipules lanceolate

Leaves fleshy, terete, stipules ovate.

Capsule twice as long as the sepals

Capsule little longer than the sepals

1. *S. rubra*.

2. *S. canadensis*.

3. *S. marina*.

1. *S. rubra* Prés! Diffusely branching, 6-12 cm. high, ascending, usually glandular often forming mats; leaves flat, hardly fleshy; pods and pink corolla about equaling the calyx; seeds very small, brown, minutely roughened with projecting points. Introd. widely. Dry soil.

2. *S. canadensis* Don. Glabrous and diffusely branching, 1 dm. or so high, leaves not fascicled; flowers small, pale-pink; pod somewhat blunt, much longer than the calyx, which is spreading in fruit; the lower pedicels 2-3 times as long as the sepals; seeds light brown usually winged, slightly glandular. Muddy, saline shores. Vancouver; Fraser Delta.

3. *S. marina* Griseb. Branching from base or simple, erect or spreading, 1 dm. or so high, glabrous to glandular-pubescent, the inflorescence usually glandular; leaves often fascicled; pod acute, not much if at all longer than the calyx, which remains erect in the mature fruit; flowers pinkish, the lower pedicels equaling the calyx; seeds dark brown, smooth, winged; Salt marshes; Lulu Is.; Victoria.

2. SPERGULA (SPURREY)

Leaves in whorls; petals white, entire; stamens 5 or 10; styles and valves of pod 5 (*L. spargere* to scatter).

1. *S. arvensis* L. (CORN SPURREY). A bright-green, pubescent annual, usually slightly glandular; leaves filiform with minute stipules; capsule ovoid, enclosed by the calyx; seeds black, slightly margined, minutely white-papillose. Widely introduced.

2. *S. sativa* Boenn. Similar, dark-green, viscid; flowers ill-scented; seeds margined, obscurely dotted, without whitish papillæ. Introd. but not so common as the former. V. I.

3. SAGINA (PEARLWORT)

Low, matted, or tufted, leaves linear, usually more or less connate by a basal membrane, glabrous (in ours) flowers 1-few on long pedicels; petals entire or wanting; stamens as many as the 4-5 obtuse sepals or fewer, often twice as many; styles as many as the sepals and alternate with them; pod 4-5 valved, the valves opposite the sepals. (*L. sagina*, fattening).

Capsule about equaling the sepals 1. *S. stricta*.

Capsule decidedly longer than the sepals.

Sepals 2.5-3 mm. long, leaves slightly fleshy 2. *S. crassicaulis*.

Sepals 2.5 mm. long or less, leaves not fleshy.

Petals longer than the purplish sepals 3. *S. nivalis*.

Petals not exceeding the green sepals, or wanting.

Capsule 2.5 mm. long, mostly 5-valved; perennial 4. *S. saginoides*.

Capsule 2 mm. long, mostly 4-valved, annual 5. *S. occidentalis*.

1. *S. stricta* Fries. More or less prostrate, branching; leaves slightly fleshy, blunt or apiculate, rounded on the back; the parts of the flower in 4's, pedicels erect, the petals shorter than the sepals; valves of the capsule 4. Langford, V. I.; Introd.

2. *S. crassicaulis* Wats. Perennial, tufted, 2.5-10 cm. high, stems branching, slightly fleshy; leaves thickish, pungent; flowers 1 to few; pedicels erect; sepals a little longer than the petals; the capsule 5-valved, $\frac{1}{3}$ longer than the sepals. Near the shore, Vancouver; and V. I.

3. *S. nivalis* Fries. Basal leaves subulate the petals longer than the purple-tinged sepals. A northern species, found also in the mts. of Colorado.

4. *S. saginoides* (L.) Brit. Perennial, the tufted stems decumbent, 2.5-8 cm. high; leaves linear, some of them slightly scarious-margined, pungent, flowers mostly solitary on terminal filiform pedicels; the parts of the flower usually in 5's, petals shorter than or hardly exceeding the sepals, which are 2 mm. long; pedicels erect, ripened pods much longer than the sepals; stamens 10. Nanaimo, Vancouver; and in the mts., Coast to Rockies; Alaska.

5. **S. occidentalis** Green. Matted, not tufted, very slender, branching above, 2.5-10 cm. high, leaves linear, not crowded at base, pungent; flowers usually many; sepals less than 2 mm. long; petals when present, shorter; pods much longer than the sepals, finally erect. Moist places in the Coast region; Elgin; Victoria; Alaska.

4. ARENARIA (SANDWORT)

Low, usually tufted, perennials or sometimes annuals, with usually narrow, sometimes fleshy leaves; sepals 4-5, petals 4-5, small and white, entire or slightly notched, or none; stamens 10, styles 3; pods small, splitting into as many, or twice as many valves as there are styles. (*L. arena*, sand, in which certain species grow).

Seeds few, appendaged at the hilum; leaves 3-15 mm. broad.

- | | |
|--|------------------------------|
| Leaves thin (sub-genus <i>Mœhringia</i>). | |
| Sepals obtuse, shorter than the petals | 1. <i>A. lateriflora</i> . |
| Sepals acuminate longer than the petals | 2. <i>A. macrophylla</i> . |
| Leaves thick (sub-genus <i>Ammodenia</i>) | 3. <i>A. peplodes</i> . |
| Seeds many, naked at the hilum, leaves narrower. | |
| Ripe carpels 2-toothed, pod 6-valued. | |
| Leaves ovate small | 4. <i>A. serpyllifolia</i> . |
| Leaves linear. | |
| Sepals obtuse | 5. <i>A. capillaris</i> . |
| Sepals acute | 6. <i>A. glabrescens</i> . |
| Ripe carpels entire, pod 3-valued. | |
| Sepals obtuse | 7. <i>A. sajanensis</i> . |
| Sepals acute. | |
| Plant more or less pubescent throughout. | |
| Leaves pungent, sepals not strongly nerved | 8. <i>A. Nuttali</i> . |
| Leaves not pungent, sepals strongly nerved | 9. <i>A. verna</i> . |
| Plants glabrous or glandular above. | |
| Sepals lanceolate, hardly 2.5 mm. long | 10. <i>A. tenella</i> . |
| Sepals ovate, 3-4 mm. long | 11. <i>A. stricta</i> . |

1. **A. lateriflora** L. Stems slender, minutely pubescent, 1-2 dm. high; leaves oblong to oval, acute or obtuse, 1-2.5 cm. long, peduncles 1-2-flowered; capsule twice as long as the calyx; seeds light brown, minutely rough. Sandy or damp ground, Atlantic to Pacific; Penticton; Crow's Nest Pass; north to lat. 60°.

2. **A. macrophylla** Hook. (LARGE-LEAVED S.) Minutely pubescent, stems stouter, about 1 dm. high, often tufted; leaves lance-oblong, acute, 1-3 cm. long; peduncles 1-3 flowered, inflorescence often a 3-flowered cyme; capsule equaling the calyx. Common in woods, V. I.; Dewdney Trail.

3. **A. peplodes** L. (SEASHORE S.) Stems stout, 1-3 dm. high; leaves ovate, slightly clasping, very fleshy; flowers nearly sessile in the axils, greenish petals about equaling the sepals. Sea shores to Alaska. The common form about Vancouver is var. *Major* Hook. Leaves oblong-ovate, 2-4 cm. long, petals $\frac{2}{3}$ as long as the sepals.

4. **A. serpyllifolia** L. (THYME-LEAVED S.) Puberulent, 5-15 cm. high, diffusely branching from base or simple; leaves about 3 mm. long; flowers in leafy cymes, sepals acute, about equaling the petals, and slightly shorter than the flask-shaped pod; seeds dark, rough. Very common throughout.

5. **A. capillaris** Poir. (HAIR-LEAVED S.) Glabrous, erect, scarcely tufted, 1-2 dm. high; leaves erect, linear, rather rigid, apex somewhat pungent, often glaucous, 1.5-2.5 cm. long, chiefly basal, somewhat fascicled; the cauline few, shorter; bracts of inflorescence lanceolate, scarios, petals considerably exceeding the obtuse green sepals. Our principal forms are var. *nardifolia* Regel. Glandular above, petals twice as long as the sepals; Coast to Rockies; Alaska; and var. *formosa* Regel. Glabrous, petals at least twice as long as the calyx. Rockies, Alaska.

6. **A. glabrescens** Piper. Stems many, from a thick, woody caudex, more or less glandular-pubescent, 1-1.5 dm. high, with many setaceous nearly glabrous leaves at base; flowers more or less clustered on short pedicels; bracts broad and scarios, petals little exceeding the acuminate, scarios-margined sepals. Alberta and Wn.; possibly in Kootenay.

7. **A. sajanensis** Willd. Stem minutely glandular-pubescent, tufted, 2-10 cm. high; very leafy below, leaves linear, obtusish, rather rigid, 4-8 mm. long, usually glabrous; flowers 1-3; sepals linear-oblong, strongly nerved, glandular-pubescent; petals much longer; capsule oblong exceeding the sepals. Alpine, Cascades to Rockies; Alaska.

8. **A. Nuttallii** Pax. Tufted, 5-10 cm. high, from a rather woody base, usually glandular-pubescent throughout; leaves linear, pungent, crowded below, 7-10 mm. long, connate; flowers 1-several in a spreading cyme; sepals acuminate, often purplish, exceeding the subacute petals; capsule shorter than the sepals. Alpine, especially on slides; S. Kootenay Pass; Cheam.

9. **A. verna** L. Tufted, pubescent or glabrous, sometimes glandular; stems filiform, less than 1 dm. high, with few leaves; leaves linear, crowded below, 3-nerved, flat, acute; flowers 1-several; petals shorter, or usually longer than the strongly 3-nerved sepals; pod longer than the sepals. Alaska south-eastward. Var. **propinqua** (Rich.) Fernald. Glandular-pubescent leaves acute, flat or somewhat triquetrous, petals shorter than, or equaling, the sepals. A common form in the mts. Var. **hirta** (Wormsk) Wats. Leaves obtuse, flat. Arctic. Var. **equicaulis** A. Nels. Leaves sub-cylindrical, acute, nearly glabrous, pedicels and peduncles subequal. Rockies, southward.

10. **A. tenella** Nutt. (SLENDER S.) Annual; stems usually solitary, slender, 0.5-1 dm. high; glabrous, leaves filiform-subulate, peduncles minutely glandular; sepals ovate-lanceolate, 3-nerved, shorter than the petals; capsule a little longer than the sepals; seeds minutely roughened. Dry places, Victoria; Sidney.

11. **A. stricta** Fenzl. (ROCK S.) Tufted, about 1 dm. high, glabrous; leaves linear-subulate, about 1 cm. long, with a strong midrib; obtusish; flowers 3-several, petals shorter than the strongly nerved calyx; capsule slightly shorter than the calyx. Alpine or sub-alpine. Mt. Stephen; Alaska.

5. CERASTIUM (MOUSE-EAR CHICKWEED)

Low, pubescent plants; sepals and petals 5, the petals 2-cleft, rarely wanting; stamens 10 or fewer; styles usually 5, sometimes 4, opposite the sepals; pod usually long and curved with 10 teeth; seeds rough. (Greek *kersa*, a horn, descriptive of the capsule).

Petals a little longer or shorter than the sepals; mostly annuals.

Pods not nodding

Cyme dense, pedicels shorter than the sepals 1. *C. viscosum*.

Cyme open, pedicels longer than the sepals. 2. *C. semidecandrum*

Bracts scarious. 3. *C. vulgatum*.

Bracts not scarious 4. *C. nutans*.

Pod nodding in fruit

Petals much longer than the sepals; perennials.

Flowers 7-8 mm. long.

Sepals scarious-tipped, pod well exserted 5. *C. alpinum*.

Sepals purple-tipped, pod slightly exserted 6. *C. Beeringianum*.

Flowers 10-14 mm. long.

Pod not exserted, plants greenish 7. *C. effusum*.

Pod a little exserted, plants gray-pubescent 8. *C. arvense*.

1. **C. viscosum** L. Hairy, viscid annual, 1-2 dm. high; leaves ovate to obovate, flowers at first in close clusters; bracts herbaceous; petals not exceeding the acute sepals; fruiting pedicels shorter than the calyx; capsule much longer than the calyx. Introd. Victoria and Eastw.

2. **C. semidecandrum** L. Similar; viscid; about 1 dm. high; leaves smaller, ovate or oblong; sepals acute, more broadly scarious at the apex; fruiting pedicels but little longer than the calyx; seeds smaller, lighter brown. Introd. Cadboro Bay, Victoria.

3. *C. vulgatum* L. Perennial, viscid, 1.5-5 dm. high, less hairy; leaves mostly oblong, often narrowly so, but often ovate; inflorescence at first clustered, becoming open; pedicels longer than the blunt sepals; capsule much longer than the calyx. A very common weed.

4. *C. nutans* Raf. A viscid annual; stems grooved, hairy, 1.5-5 dm. high; stem leaves oblong or lanceolate, 4-8 mm. wide, 1.5-5 cm. long, the basal usually spatulate; peduncles 2-3 cm. long, bent; petals $\frac{1}{3}$ longer than the calyx; pods twice as long as the calyx. Moist ground east of the Cascades. Armstrong; Nelson; and northwards.

5. *C. alpinum* L. Pubescent, matted, 1 dm. high or less; the sterile stems prostrate; leaves oblong-oblancoelate, obtusish; flowers 1-few on slender pubescent or glandular pedicels; petals hardly twice as long as the rather obtuse, hairy, scarious-margined sepals; pod nearly twice as long as the calyx. Rockies; Alaska.

6. *C. Beeringianum* C. & S. Perennial, tufted, pubescent, but green, viscid-glandular above; 5-9 cm. high; the stems weak, ascending; the leaves oblanceolate or oblong, obtusish; flowers few, sepals acute, tinged with purple; petals from a little longer to 1.5 times as long as the sepals (about 8 mm. long); capsule but little longer than the sepals. Rockies; Alaska.

7. *C. effusum* Greene. Resembling *C. arvense*, but greener; leaves of sterile shoots, glabrous at least on the mid-vein beneath, narrowly spatulate-linear; leaves of the main stem often 3-4 mm. broad, glabrous or nearly so beneath; pubescence glandular above, spreading at base; petals twice as long as the calyx; pod equaling the calyx. Mt. Cheam; the type came from Wyoming.

8. *C. arvense* L. (FIELD M.) Tufted, pubescent, downy to nearly smooth, usually glandular above, 1-5 dm. high; leaves numerous, linear or narrowly lanceolate; flowers few, cymose; petals about twice the length of the calyx; pods $\frac{1}{4}$ - $\frac{2}{3}$ longer than the calyx. In one form or other from Atlantic to Pacific, and northwards to Alaska. Var. *strictum* Rydb. Flowers few in a close cyme. Rockies.

The western somewhat more villous forms with larger flowers than the eastern are said to be either *C. campestre* Greene; main stem-leaves erect, 1-2 cm. long; V.I. to Idaho; or *C. graminifolium* Rydb.; main stem-leaves spreading, 1.5-3 cm. long; V. I. to Rockies; Chilliwack Valley.

6. STELLARIA (CHICKWEED)

Low, weak, spreading or erect annuals or perennials; sepals 4 or 5, petals white, 2-cleft, 4 or 5, sometimes wanting; stamens 10 or fewer; styles 3 (rarely 4 or 5) opposite the sepals; pod 1-celled, opening by twice as many valves as there are styles, many-seeded. (*L. stella*, a star, descriptive of the flower).

Stems pubescent.

Styles 5 1. *S. aquatica*.

Styles 3 or 4.

Leaves lanceolate, 2-4 cm. long. 8. *S. longipes*.

Leaves shorter, or if as long, not lanceolate.

Leaves linear 2. *S. nitens*.

Leaves lance-ovate 3. *S. calycantha*.

Leaves ovate, petioled 4. *S. media*.

Stems glabrous or practically so.

Upper bracts scarious.

Petals shorter than the sepals, or none;

Capsule twice as long as the sepals 5. *S. umbellata*.

Capsule equaling the sepals 6. *S. uliginosa*.

Petals longer than the sepals.

Pedicels erect, capsules dark.

Plants 2-4 dm. high, leaves 2-4 cm. long 8. *S. longipes*.

Plants 1 dm. high, leaves about 1 cm. long 7. *S. laeta*.

- Lower pedicels reflexed, capsules pale.
- Seeds rough 9. *S. graminea*.
 Seeds smooth 10. *S. longifolia*.
 None of the bracts scarious.
- Leaves linear to lanceolate, more than 4 times as long as broad.
 Petals shorter than sepals, or none 11. *S. borealis*.
 Petals longer than the sepals 12. *S. crassifolia*.
 Leaves ovate-oblong, or lance-oblong, less than 4 times as long
 as broad.
- Sepals obtuse, hardly scarious-margined 13. *S. obtusa*.
 Sepals acute.
- Leaves ovate.
 Leaves 6-15 mm. long, seeds rough 14. *S. crispa*.
 Leaves 4-6 mm. long, seeds smooth 15. *S. humifusa*.
 Leaves oblong-lanceolate 6. *S. uliginosa* var.

1. *S. aquatica* Scop. Perennial, glandular-pubescent above; leaves large, ovate-cordate, the lower petiolate; petals much longer than the glandular-pubescent sepals; capsule a little longer than the calyx. Nanaimo. Introd.

2. *S. nitens* Nutt. (SHINING CHICKWEED). Tufted, erect, 1-2 dm. high, leaves linear; stems shining, hairy only at the base, wiry; leaves less than 1 cm. long, erect, the lowest broader, petioled; pedicels erect, bracts small, scarious, sepals acuminate, twice as long as the petals, which are sometimes wanting; capsule slightly shorter than sepals. Dry open places, V. I.; Agassiz and Eastward to Rockies; Bowen Is.

3. *S. calycantha* Bong. Stems slightly pubescent or puberulent, weak, 1 dm. high; leaves ovate to lanceolate, connate, minutely ciliate; sepals acute, usually scarious-margined, much longer than the petals; pod sub-globose, obtuse. Nearly related to *S. borealis*, in which it is sometimes included. In wet meadows, Alaska southward in the mts.

4. *S. media* (L.) Cyrill. (COMMON CHICKWEED). Annual; stem with 2 hairy lines; leaves ovate, the lower on pubescent petioles; petals 2-parted, shorter than the sepals; stamens 3-7; capsule a little longer than the hairy calyx; seeds rough. Introd. everywhere. Var. *procera* K. & R. (*S. neglecta* Weihe.) Stamens 10, seeds more or less crested. Occasionally found; V. I.

5. *S. umbellata* Turcz. Stems slender, ascending; leaves elliptic-oblong to lance-linear; flowers in a simple or compound, sub-umbellate cyme, on long filiform pedicels; bracts small, scarious; sepals 2-3 mm. long, capsule twice as long. Rockies; Crow's Nest Pass; and northw.

6. *S. uliginosa* Murr. Stems usually in masses, weak, decumbent at length prolonged, leaving the naked cymes lateral; leaves lanceolate or oblong, less than 4 times as long as broad, narrowed at base; petals shorter than the capsule, and about equaling the calyx; seeds rough. Alaska southward in Rockies to Northeast B. C.

S. uliginosa Murr. Var. *oblongifolia* (—) Stems slender, firm, strict, ascending, 2-3 dm. high; leaves thickish 8-12 mm. long; flowers axillary, sepals acute, longer than the deeply bifid petals and the capsule, narrowly scarious-margined; pedicels erect, clavate under the ripened capsule; seeds rough. Salt marshes, Vancouver.

7. *S. læta* Rich. Stems firm, usually smooth, very glaucous throughout; leaves rather stiff, keeled, lanceolate; flowers 1-few; anthers yellowish; otherwise as in the following; pod from a little longer than to twice as long as the acute or obtuse sepals. Rockies; Armstrong.

8. *S. longipes* Goldie. Erect or decumbent, usually glabrous, leaves rather firm, spreading or ascending, tapering from near the base, glabrous or shining; pedicels 3-7 cm. long; pod nearly twice as long as the obtuse sepals. Atlantic to Pacific. Our native western plants are distinct in their purple anthers and short pods, a little longer than the acute sepals, and should be called *S. strictiflora* (Rydb.) Macoun. (*S. stricta* Rich.) V. I.; Armstrong; Alaska.

9. *S. graminea* L. Stem weak, ascending or reclining; leaves lanceolate, broadest just above the often ciliolate base, spreading or ascending; seeds minutely roughened; bracts ciliate, petals 2-cleft. Chilliwick River; Golden.

10. *S. longifolia* Muhl. Stem erect, slender and weak, often with rough angles; leaves linear, acute at both ends, spreading; bracts of cyme small, scarious, the filiform pedicels spreading or deflexed; petals 2-parted. Grassy places; Armstrong; Nanaimo; Alaska.

11. *S. borealis* Bigel. Stems weak, simple or branching, 1-3 dm. high, very glabrous or slightly pubescent above; leaves broadly lanceolate, often ciliate at base, otherwise glabrous; inflorescence a terminal cyme, pedicels ascending or spreading; styles often 4; seeds smoothish. Alaska southward and eastward; Roger's Pass; Mt. Cheam. The common form at the Coast is var. *alpestris* Brit. Taller, erect or reclining, 4-5 dm. high, stem angled, pedicels arcuately deflexed; seeds rough. V. I.; Vancouver, and eastward; Alaska.

12. *S. crassifolia* Ehrh. Stems weak, diffuse or erect; leaves slightly fleshy, lanceolate to oblong; flowers terminal or axillary, petals longer than acute sepals; capsule longer than the sepals; seeds rough. Alaska southward in Rockies.

13. *S. obtusa* Engelm. The short stems prostrate; leaves ovate, acute; pedicels solitary, short, petals wanting; sepals without scarious margin; seeds brown, rough, Kootenay; Macleod's Lake.

14. *S. crispa* C. & S. Glabrous, the long filiform stems prostrate or ascending; leaves ovate, acute or acuminate, the margin sometimes crisp; pedicels solitary, often finally deflexed, 0.5-1.5 cm. long; sepals 3-nerved, with a scarious margin; capsule $\frac{1}{4}$ longer than the calyx; petals usually none. Alaska southward; woods; Vancouver; Victoria; and on mts.

15. *S. humifusa* Rottb. Spreading or creeping; stems and branches 5 cm. high; 1-3 flowered; leaves fleshy, ovate or elliptical, 4-6 mm. long; petals a little longer than the sepals; seeds smooth. V. I.; Alaska.

7. DIANTHUS (PINK, CARNATION)

Calyx cylindrical, 5-toothed, subtended by 2 or more bractlets; stamens 10; styles 2; pod 4-valved; petals toothed or serrate. An introd. genus, 2 species of which are found near Victoria. (Gk. *Dios*, of Jupiter, and *anthos*, a flower).

1. *D. Armeria* L. (DEPTFORD PINK). Annual, leaves linear, erect, 4-5 cm. long; flowers pink, in terminal clusters; bracts lanceolate, mostly longer than the calyx.

2. *D. deltoides* L. Perennial, leaves linear, erect, 2-3 cm. long; flowers pink, solitary at the ends of the stem; bracts ovate, not half as long as the calyx.

8. SILENE (CATCHFLY, CAMPION)

Herbs with opposite leaves, and solitary or cymose flowers; calyx 10-many nerved; petals mostly with an appendaged blade, white or red; stamens 10; styles 3; pod 1-celled, opening by 3 or 6 teeth at the apex; often stipitate.

Dwarf, acaulescent, tufted, Alpine plants	1. <i>S. acaulis</i> .
Cauliscent.	
Glabrous and glaucous, not viscid	2. <i>S. latifolia</i> .
Pubescent or more or less glandular or viscid.	
The upper internodes with viscid bands.	
Calyx ovoid, pedicels 5-15 mm. long	3. <i>S. antirrhina</i> .
Calyx club-shaped, pedicels 2-3 mm. long	4. <i>S. Armeria</i> .
Plants glandular-pubescent, at least above.	
Flowers open at night, plants 3-6-dm. high	5. <i>S. noctiflora</i> .
Flowers open during the day, plants 2-3 dm. high.	
Inflorescence racemose or spicate.	
Annual, flowering early, calyx 7 mm. long.	6. <i>S. gallica</i> .
Perennial, flowering late in June, calyx 15 mm. long	7. <i>S. Scouleri</i> .
Inflorescence clearly cymose.	
Bracts green and leafy	8. <i>S. Menziesii</i> .
Bracts small	9. <i>S. Douglasii</i> .

1. *S. acaulis* L. (MOSS CAMPION). In moss-like tufts, with strong roots; perennial; glabrous, or nearly so; leaves crowded, linear; petals purple red, entire or barely lobed; flowers sessile, or on a peduncle 1-2 cm. long. Alpine Summits, Coast eastward, Alaska.

2. *S. latifolia* Brit. & Ren. (BLADDER CAMPION). Perennial, 3-5 dm. high; leaves ovate lanceolate; calyx globular-ellipsoidal, much inflated, clearly and beautifully reticulate-veined; petals 2-cleft, nearly crownless. (*S. inflata*.) Introd. V. I. Occasionally about Vancouver and along the railways.

3. *S. antirrhina* L. (SLEEPY CATCHFLY). Slender, with ascending branches, or nearly simple, 2-6 dm. high; stem pubescent, the upper internodes viscid-banded; leaves linear-lanceolate; petals white or purplish especially beneath, expanding in sunshine, exceeding the petals 2-3 mm. blade obovate-cuneate, 2-cleft. Dry soil; V. I. Var. *depauperata* Rydb. Petals small or none, not exceeding the sepals; blade cuneate, truncate or emarginate. Sask. to B. C.; Lower Arrow Lake.

4. *S. Armeria* L. (SWEET WILLIAM CATCHFLY). Glaucous, 2-3 dm. high, glutinous below each node; leaves oblong-ovate to lanceolate; flowers in flat cymes, opening in sunshine, petals rose or white, notched, with small appendages. A garden escape; Victoria, and along the E. & N. Ry.; Arrowhead.

5. *S. noctiflora* L. (NIGHT-FLOWERING CATCHFLY). Pubescent and viscid lower leaves obovate to oblanceolate, narrowed to a petiole, the upper lanceolate; flowers on peduncles 3-5 cm. long; fragrant, 2.5 cm. broad, opening at night; calyx beautifully veined, with awl-shaped teeth; the tube 2 cm. long, much enlarged by the ripening sessile pod. Introd. Yale, Penticton.

6. *S. gallica* L. Somewhat hirsute, glandular at least above, 2-3 dm. high; leaves 1.5-2.5 cm. long, spatulate, obtuse; calyx ovoid, 7 mm. long; petals white or red, 2-lobed or entire, the blade 3-4 mm. long. Introd. Very common on V. I., rarer on the mainland. Flowering April and May.

7. *S. Scouleri* Hook. (SCOULER'S PINK). Very glandular-pubescent, stout, simple, 3-5 dm. high; leaves 5-6 cm. long, lanceolate; calyx 15-18 mm. long; petals white or pink, the blade 6-7 mm. long, appendaged, 4-lobed; ovary long stipitate. Common about Victoria, (where it blooms early in July), and probably in the interior, as the plant occurs in Idaho.

8. *S. Menziesii* Hook. Stems solitary or tufted, simple or dichotomously branching, pubescent; leaves elliptical, acute at both ends, 0.5-2 cm. broad, short, pubescent on both faces or glabrate above; pedicels variable; calyx about 6 mm. long; petals white or pink, crownless; seeds purplish. (*Anolitis Menziesii* Greene, and *A. latifolia* Greene). Woods, Yale and eastward.

9. *S. Douglasii* Hook. Stems many, slender, erect, pubescent, nearly naked above, sometimes glandular above; leaves narrowly oblanceolate, 3-8 cm. long, the lower tapering to a petiole, all puberulent; calyx 10-15 mm. long, often inflated, sub-cylindrical; petals well exerted, white or pink, with 2 broad obtuse lobes, the claws, filaments and stipe more or less villous; ovary rather long-stipitate. East of the Cascades.

Var. *viscida* Rob. Glandular-viscid, especially above, leaves thickish; calyx 1 cm. long. Kicking Horse Lake.

Var. *Macounii* Rob. Less pubescent below, glandular above, petals, claws and filaments glabrous or nearly so; petals 4-lobed, the lateral lobes narrow. Rockies; Blackwater.

Var. *multicaulis* Rob. Grayish-tomentulose, not glandular. D. I.; Stump Lake, Naramata.

9. AGROSTEMMA (CORN COCKLE)

Tall, silky plants with purplish-red flowers, and linear-leaved calyx, ovoid with 10 prominent ribs, and long lobes, petals unappendaged. (Gk. agros, a field, and stemma, a crown).

1. *A. Githago* L. Flowers, 3-4 cm. across, purplish-red, spotted with black. Introd. Grain fields, Okanagan Valley; Victoria.

10. LYCHNIS (CAMPION)

Styles 5, pod opening by as many or twice as many teeth; otherwise much as *Silene*.

1. *L. coronaria* Desr. (MULLEIN PINK). A woolly white plant, 4-9 dm. high; leaves ovate-oblong, sessile; petals crimson; calyx-teeth twisted. A garden escape. Nanaimo, etc.

2. *L. Drummondii*, Wats. Glandular-pubescent above, 2-5 dm. high; leaves oblanceolate, narrowed to a petiole or the upper sessile; stems few-flowered; flowers on stout erect peduncles, the petals entire or notched, white or purplish, hardly exerted beyond the calyx tube; calyx-teeth not twisted. Alberta to Wn.; probably in Kootenay.

3. *L. apetala* L. (NODDING L.) More or less glandular-hairy, 0.5-1.5 dm. high; leaves linear or oblanceolate 2-5 cm. long; flower solitary, nodding; calyx strongly purple veined, the teeth triangular-ovate, acute; petals narrow 2 cleft, purple equalling, or shorter than the calyx tube. Rockies and Selkirks.

11. SAPONARIA

Glabrous herbs with broad leaves, and large pink flowers; calyx ovoid or with 5 short teeth; naked, obscurely nerved; pod 1-celled, or incompletely 2-4 celled at base, opening by 4 valves. (Sapo, soap).

1. *S. Vaccaria* L. (COW-HERB). Annual; leaves clasping, ovate; flowers long-peduncled, cymose; calyx 5-winged; petals red, not appendaged. Introd. common about Vernon. *S. officinalis* L. (SOAPWORT, BOUNCING BET) with appendaged petals and wingless calyx is sometimes seen about old gardens.

PORTULACACEÆ (PURSLANE FAMILY)

Low succulent herbs, with perfect, unsymmetrical, flowers; sepals usually 2, petals few or wanting to many; stamens opposite the petals with of the same number, but often indefinite; ovary mostly superior, 1-celled, placentæ free; central; fruit a capsule, circumscissile or 2-3 valued; styles 2-8 united below.

Calyx free from the ovary, persistent except in No. 2.

Sepals 4-8.

Sepals 2.

Capsule circumscissile

Capsule not circumscissile.

Stamens 20-30

Stamens 3-10.

Petals 3-7, stamens usually not the same number as the petals, sepals or leaves often ciliate

Petals mostly 5, stamens as many on their bases, plants glabrous.

Plants from corms or thick roots

Plants with fibrous roots

Calyx adnate to the base of the ovary

1. *Lewisia*.

1. *Lewisia*.

2. *Talinum*.

3. *Calandrinia*.

4. *Claytonia*.

5. *Montia*.

6. *Portulaca*.

1. LEWISIA (BITTER-ROOT)

Perennials, with fleshy roots; flowers solitary or several on scape-like stems, sepals 2-8, petals 3-16, stamens 5-many, styles 2-8-cleft; capsule circumscissile at the base, and then bursting irregularly. (Named for Lewis of the Lewis and Clarke expedition).

1. *L. rediviva* Pursh. (SANDHILL ROSE). Low, leaves clustered at base, linear-oblong, subterete, soon withering; scapes 2-3 cm. long; flowers solitary,

3-5 cm. broad, petals 10-15 rose or white. The roots are very tenacious of life; hence the specific name. The root contains a large amount of starchy material, and, though slightly bitter, is, or was, used by the Indians of Oregon as food under the name of spætium. Plains D. I.; Summerland.

2. *L. columbiana* (Howell) Rob. Scapose stems 1-2 dm. high, bearing racemes; leaves linear spatulate, 3-6 cm. long; flowers several, about 2 cm. broad, white or pink; petals 4-7; sepals 2 entire. Mt. Arrowsmith, V. I. *L. pygmæa* (Gray) Rob. Plants 2-8 cm. high; flowers 1-3, petals red, about twice as long as the erose sepals. Cascades, lat. 49°.

2. TALINUM (ROCK PINK)

Low, with scapose stems bearing racemes; leaves linear; petals 5, mostly red or white; stamens many, adherent to the bases of the petals; style trifid; capsule 3-valved, seeds smooth, numerous.

1. *T. spinescens* Torr. Caudex beset with subulate spines, the remains of former midribs; leaves terete. Stump Lake, southw.

3. CALANDRINIA

Low, erect or ascending annuals with alternate leaves and flowers in bracted racemes; stamens 3-10, rarely the same number as the 3-7 petals; capsule 3 valved, seeds 3-6, black, shining, minutely roughened. (Calandrini was a Swiss botanist).

1. *C. caulescens* H. B. K. Glabrous or slightly pubescent, branching from the base, 0.5-1.5 dm. long, leaves linear-lanceolate, the lower petioled; buds 4-angled, sepals with a glabrous or ciliate keel; petals red, about equaling the sepals. Var. *Menziesii* Gray. Hook. Leaves and sepals stiffly ciliate. Victoria; Nanaimo.

4. CLAYTONIA (SPRING-BEAUTY)

Perennials from corms or thickened roots; stem-leaves 2, opposite, or 1-3 and alternate; flowers in racemes; petals 5, equal, free; stamens 5 on the base of the petals; styles 3-cleft; capsule 3-valved; seeds 3-6, smooth, shining. (Clayton was an American botanist).

1. *C. lanceolata* Pursh. Stems usually 1, sometimes several, from a round corm; 1-1.5 dm. high; cauline leaves opposite lanceolate, 2-4 cm. long, the radical often wanting; cyme naked save for a scarious bract at the base; petals white or rose, 6-7 mm. long. Mts. and rich woods, Squamish; Mt. Cheam; Rockies. (*C. multicaulis*).

2. *C. megarrhiza* Parry. Caudex thick from a large, fusiform root; basal leaves numerous, cuneate with a rounded apex, petiolate; the cauline alternate, 1-3; raceme bracted at base; petals white or pink, about 8 mm. long. Rockies.

5. MONTIA (SPRING-BEAUTY, MINER'S LETTUCE)

Roots fibrous, stem-leaves few to many; when 2 forming an involucre; petals 5, rarely 3 or wanting, more or less united at base, usually unequal, 3 a little smaller than the other 2; stamens as many as the petals inserted on their bases; ovary 3-valved, 3-seeded; seeds smooth or roughened. (Monti was an Italian botanist).

Stem-leaves 2.

Stem-leaves not united at base.

Plants with creeping rootstocks, pedicels bractless 2. *M. asarifolia*.

Plants without rootstocks, pedicels bracted 1. *M. sibirica*.

Stem-leaves united at base.

Involucre a round disk.

Calyx 3-4 mm. long, plants usually 2 dm. high 3. *M. perfoliata*.

Calyx 2 mm. long, plants usually 1 dm. high or less.

Basal leaves linear 4. *M. parviflora*.

Basal leaves ovate 4a. *M. p.* var. *depressa*

Involucral leaves lanceolate to linear not forming a round disk.

Petals usually white, stem-leaves lanceolate 5. *M. spathulata*.

Petals usually pink, stem-leaves linear 5a. *M. s.* var. *exigua*.

Stem leaves more than 2.

Stem leaves opposite.

Annual, petals 2 mm. long, white 6. *M. fontana*.

Perennial, petals 6-8 mm. long, pink 7. *M. Chamissoi*.

Stem leaves alternate.

Leaves very fleshy, petals much longer than the calyx; perennials.

Leaves roundish 8. *M. sarmentosa*.

Leaves oblanceolate 9. *M. parvifolia*.

Leaves not very fleshy; petals little, if at all, longer than the calyx; annuals.

Leaves spatulate, 4-8 mm. long; seeds shining 10. *M. Howellii*.

Leaves linear, 1-2 cm. long, seeds dull 11. *M. dichotoma*.

Leaves linear, 2-6 cm. long, seeds shining 12. *M. linearis*.

1. *M. sibirica* (L.) Howell. Stems 0.4-4 dm. high, from a thickened caudex; basal leaves rhombic to ovate or lanceolate, with long petioles enlarged at base; involucre leaves ovate to lanceolate; racemes becoming greatly elongated, pedicels 1.5-4 cm. long; petals usually pink, oblong-obovate, notched, clawed, 5-9 mm. long; seeds rough, shining. Moist ground. Common in Coast region; Alaska.

2. *M. asarifolia* (Bong.) Howell. Similar, basal leaves subcordate or reniform to rhombic ovate; flowers white, few, a little longer, pedicels 1-2 cm. long, only the lowest bracted, or bracts quite wanting. Alaska southward to Wn. V. I.; Nelson.

3. *M. perfoliata* (Don.) Howell. Stems 1.5-4 dm. high; basal leaves ovate to deltoid, long-petioled, flowers nodding, petals white, a little longer than the calyx, on bractless, short pedicels; seeds smooth, shining. V. I. eastward. The upper (involucre) leaves are often united only on one side.

4. *M. parviflora* (Dougl.) Howell. Green or glaucous, 1-1.5 dm. high or less; basal leaves linear to spatulate; involucre leaves often joined only on one side, (disk lobed); flowers clustered in the involucre, or on short racemes or pedicels, 3-4 times as long as the flowers; petals little longer than the small calyx; seeds roughened, shining, hardly 1 mm. broad. V. I. Var. *depressa* Rob. Flowers clustered in the axils of the involucre and not exceeding it. V. I.

5. *M. spathulata* (Dougl.) Howell. Usually very glaucous; stems 3-10 cm. long; basal leaves terete or some of the outer spatulate, stem-leaves ovate to lanceolate, somewhat united at base on one or both sides; petals white, not much longer than the calyx; seeds minutely roughened. Var. *exigua* Rob. Petals usually rose; stem leaves little, if at all, dilated. Near Victoria.

6. *M. fontana* L. (Blinks). Very slender, 2-10 cm. high, with a few pairs of small opposite leaves, decumbent, branching from the base; petals 3, white, scarcely longer than the calyx; flowers few; seeds 3, very rough, not shining. Wet places, V. I.; Kootenay.

7. *M. Chamissoi* (Led.) Dur. & Jack. Procumbent or ascending, slender, often rooting at the joints; often bulblet-bearing; leaves obovate, in several pairs, 2-3 cm. long; petals 5, rose or white, much exceeding the small calyx. Wet places, Alaska to Colorado; Comox.

8. *M. sarmentosa* (Bong.) Stems filiform, 3-5 dm. long; leaves alternate, 1.5 cm. long, ovate, obovate, or the radical round, producing bulblets in the axils; petals red, unequal, 10-14 mm. long. Wet rocks, near seashore; Prince Rupert and northern.

9. *M. parviflora* (Dougl.) Howell. Perennial, producing slender stolons; stems filiform, leaves very fleshy, oblanceolate to spatulate, 10-15 mm. long, often bulblet-bearing, the flowers also sometimes replaced by bulblets; petals 5, 8-10 mm. long, pink; seeds minutely roughened. V. I. to Rockies.

10. *M. Howellii* Wats. Slender, diffusely branched, rooting at the nodes; leaves narrowly linear-spatulate, 4-8 mm. long; pedicels shorter, reflexed in fruit, flowers few, petals very small, usually 2 or 3, rarely wanting; stamens 2 or 3; seeds 1 mm. wide, smooth, shining. V. I.

11. *M. dichotoma* (Nutt.) Howell. Erect, 3-8 cm. high, simple or branching from the base; leaves 1-2.5 cm. long; flowers in racemes, petals 2-3 mm. long, a little longer than the often reddish sepals, usually 5; stamens 2-5; seeds 1 mm. wide, roughened, dull. V. I.

12. *M. linearis* (Dougl.) Greene. Stems erect, 0.8-2 dm. high, simple or branching from the base, leaves 2-7 cm. long; flowers usually rather dense in 1-sided racemes; stamens usually 3; petals white, 4 mm. long, about as long as the often reddish sepals; seeds large, nearly 2 mm. wide, smooth, shining. V. I. to Rockies.

6. PORTULACA

Fleshy annuals with alternate leaves; petals 5, stamens 7-20, style 3-8-parted; pod many-seeded, circumscissile, opening by a lid.

1. *P. oleracea* L. (PURSLANE). Prostrate, glabrous; leaves obovate or cuneate; flowers sessile, opening only on sunny mornings; sepals keeled; petals pale yellow; stamens 7-12; style deeply to 5-6 parted. Introd.; Okanagan, Cowichan.

NYMPHACEÆ (WATER-LILY FAMILY)

Aquatic herbs with large floating leaves; sepals 3-12, petals 3-many, mostly hypogynous; carpels 3-many, distinct or united; ovules borne on the sides, or when solitary hanging from the summit, of the cells; embryo enclosed in a little bag near the hilum. The two following represent Families rather than Genera.

Leaves cordate; flowers large; sepals 4-6, petals numerous; carpels united, the compound ovary with radiating stigmas on the top as in the poppy

Leaves peltate; flowers small; sepals and petals 3-4; carpels separate

1. *Nymphæa*.
2. *Brasenia*.

1. NYMPHÆA (YELLOW POND-LILY)

Sepals concave, large, petals small, thick, scale-like, inserted with the numerous stamens under the ovary; the numerous ovules on the sides of the cells; leaves cordate; the flowers usually above the surface. (Dedicated to the Water-Nymphs).

1. *N. polysepala* (Engelm.) Greene. Leaves usually floating, but sometimes above the water, ovate-oblong; sepals yellow, (or in *var. picta* Engelm. tinged with red) unequal, 8-12 in number, petals 10-18, 5-6 mm. wide, much wider than the filaments; anthers shorter than the filaments; the ovary contracting below the expanded stigma disk. Common V. I. to the Selkirks; Alaska.

2. BRASENIA (WATER-SHIELD)

The stems, petioles and under surfaces of the leaves covered with gelatinous matter; leaves floating; petals oblong; carpels 4-18, forming 1-seeded, indehiscent pods; filaments filiform.

1. *B. Schreberi* Gmel. Leaves elliptical, centrally attached to the petiole, purplish beneath; flowers about 1.5 cm. long, on peduncles about 1 dm. long, purple. Lakes across the Continent. Lake Buntzen; Stanley Park, Vancouver.

RANUNCULACEÆ (BUTTERCUP FAMILY)

Herbs, mostly with acrid juice; petals 2-15, often wanting, the calyx then petaloid; sepals 3-15; flowers regular or irregular, one or more of the sepals often spurred; stamens mostly numerous; carpels few to many, separate, forming follicles or achenes; leaves often much dissected.

Carpels 1-ovuled, forming achenes.	
Mostly climbing or twining, leaves opposite.	1. Clematis.
Not climbing, leaves alternate.	
Cauline leaves in a whorl.	2. Anemone.
Cauline leaves not whorled, sometimes wanting.	
Fruiting heads long and narrow, leaves linear.	5. Myosurus.
Fruiting heads otherwise.	
Petals wanting.	
Leaves simple, flowers perfect.	3. Trautvetteria.
Leaves ternately compound, flowers diœcious.	4. Thalictrum.
Petals present.	6. Ranunculus.
Carpels with several ovules, forming follicles or berries.	
Flowers regular.	
Leaves simple.	
Petals none, leaves not lobed.	7. Caltha.
Petals small, leaves lobed.	8. Trollius.
Leaves compound.	
Sepals spurred.	9. Aquilegia.
Sepals not spurred.	
Fruit a berry.	10. Actœa.
Fruit of follicles.	
Petals large, flowers solitary.	11. Pœonia.
Petals small, or none.	
Low plants; flowers few.	12. Coptis.
Tall plants; flowers many.	13. Cimicifuga.
Flowers irregular.	
Upper sepal spurred, petals 4.	14. Delphinium.
Upper sepal hood-like, petals 2.	15. Aconitum.

1. CLEMATIS

Somewhat woody herbs climbing by the petioles of the compound opposite leaves; sepals 4 or more, petals none; the numerous carpels becoming achenes with feathery tails. (The name from Gk. *klema*, a tendril, is usually mispronounced; the accent should be on the first syllable).

1. *C. columbiana* Hornem. Leaves simply 3-foliate, ovate, slightly cordate; the leaflets petioled, simple, acute or acuminate, entire or dentate-crenulate; flowers solitary on stout, long peduncles in the axils of the leaves; sepals blue, 3-5 cm. long, oblong, acute or acuminate; some of the outer filaments sometimes enlarged; tails of the achenes 4-5 cm. long. (*C. verticillaris columbiana* Gray). Rockies; Vernon; Rossland.

2. *C. ligusticifolia* Nutt. Leaves pinnate, mostly 5-foliate; leaflets ovate, coarsely toothed; flowers diœcious in cymes; sepals white, 1 cm. long; tails of achenes 2-4 cm. long. Lytton, Kamloops; common in gardens, sometimes escaping, V. I.

3. *C. Douglasii* Hook. Erect, herbaceous, very leafy, villous; leaves cut into narrow segments; sepals purplish, large. May occur in southern Kootenay.

2. ANEMONE

Perennials with radical leaves; stems leafless except for an involucre of 3-5 leaves below the flower; petals wanting, the 5 or more sepals colored and petal-like; the numerous carpels becoming compressed achenes. (Gk. *anemos*, the wind; a common name is Wind-Flower).

Achenes with long feathery tails.

- | | |
|---|-----------------------------|
| Sepals nearly white, 15-18 mm. long | 1. <i>A. occidentalis</i> . |
| Sepals blue, 3-4 cm. long | 2. <i>A. patens</i> . |

Achenes not plumose.

Achenes densely woolly.

Low, simple, 1-flowered.

- | | |
|--|---------------------------|
| Leaf segments cuneate, sepals glabrous | 3. <i>A. parviflora</i> . |
| Leaf segments oblong, sepals pubescent | 4. <i>A. Drummondii</i> . |
| Taller, branching, 1-several-flowered | 5. <i>A. multifida</i> . |

Achenes glabrate, pubescent, not woolly.

- | | |
|---|------------------------|
| Leaflets and involucre leaves crenate-serrate | 6. <i>A. deltoidea</i> |
|---|------------------------|

Leaflets and involucre 3-5 foliate.

- | | |
|--|---------------------------|
| Involucre leaves sessile; tall | 7. <i>A. canadensis</i> . |
|--|---------------------------|

Involucre leaves petioled; low

- | | |
|----------------------------|------------------------------|
| Achenes glabrous | 8. <i>A. Lyallii</i> . |
| | 9. <i>A. narcissiflora</i> . |

1. *A. occidentalis* Freyn. (TOW-HEAD BABY). Sparingly villous, the stem glabrate, stout, 3-6 dm. high; leaves and short-petioled involucre much dissected into linear acute lobes; sepals white or purplish at the base, 15-18 mm. long; plumose achenes in a large dense head, the tails 3.5 cm. long. Mountains, Cascades to Rockies, Alaska.

2. *A. patens* Wolf gangiana Koch. (PASQUE FLOWER). Villous with long silky hairs, especially on the stem; leaves ternately divided into oblong segments, the middle division 3-parted, the others 2-parted; the flowers developing before the leaves; involucre sessile; sepals 5-7, purple or whitish, 3-4 cm. long; the plumose achenes in a more open head, the tails 2.5 cm. long. (*A. patens Nuttalliana* Gray). East of the Coast Range and far northward.

3. *A. parviflora* D C. (NORTHERN A.) Sparingly villous, 1-2 dm. high; leaves 2-3 cm. broad, 3-parted, the broadly cuneate segments crenately lobed or toothed, the involucre nearly sessile, its segments deeply lobed; sepals usually with a bluish tinge; head of achenes globular. Mt. Cheam; Golden; common in the Selkirks and Rockies; Alaska.

4. *A. Drummondii* Wats. (ALPINE A.) Sparingly villous, 1-2 dm. high; leaves 3-parted, the divisions cut into oblong obtuse lobes, the lobes of the involucre slightly broader; the outside of the sepals blue, appressed pubescent. Rockies and Selkirks.

5. *A. multifida* Poir. (WIND-FLOWER). Villous, 1.5-5 dm. high; leaves 3-5 parted, about 4 cm. broad, the segments cleft into narrowly-oblong or linear, acute lobes; the divisions of the involucre sessile or long-petioled; sepals 5-8, red or in various shades of pink, blue, or yellow; pubescent without. (*A. Hudsoniana*, *A. globosa*). Savary Is.; Spence's Bridge; Princeton; Rockies; Alaska.

6. *A. deltoidea* Hook. Stem simple, slender, 1-3 dm. high; leaflets 3-foliate, ovate or rhomboid, crenate-serrate; involucre leaves similar on very short petioles; sepals white, about 1 cm. long. Coast Range, Salmon River, southward.

7. *A. canadensis* L. Stems pubescent; leaves 8 cm. wide or more, tomentose to pubescent beneath; involucre sessile, the primary bearing a naked peduncle, and soon a pair of branches with a 2-leaved involucre, which may branch in turn; the division broadly cuneate; sepals white, about 1 cm. long, pubescent outside. (*A. dichotoma*). Princeton; Field; Banff and eastward.

8. *A. Lyallii* Brit. A very delicate plant, almost smooth, 1.5-3 dm. high, from a fleshy rootstock; the middle leaflets 3-lobed, the lateral 2-lobed, all coarsely toothed; involucre similar, its petioles 1 cm. long; flowers solitary; sepals 4-7, pale blue to nearly white, 4-5 mm. long. Damp rich woods, V. I.; Vancouver; west of Coast Range.

9. *A. narcissiflora* L. Villous, 6 dm. high; leaves cleft into linear lobes; involucre leaves similar, sessile; flowers 2-3 cm. broad, 1-several, yellowish to white. Alaska southward in the Rockies.

3. TRAUTVETTERIA (FALSE BUGBANE)

Perennial herbs with palmately lobed leaves and small flowers in terminal corymbs; sepals about 4, petal-like, caducous; petals none; stamens many, prominent achenes; numerous, compressed, somewhat 4-angled, but much like those of *Ranunculus Bongardi*. (Trautvetter was a Russian botanist).

1. **T. grandis** Nutt. Tall, 3-9 dm. high; leaves few, thin, the blades 1-2 dm. broad, the radical long-petioled, the cauline short-petioled, all deeply lobed; sepals white, $\frac{1}{4}$ as long as the stamens; achenes 2 mm. long, ovate, abruptly hooked-beaked. Rich woods, Lower Fraser; rare; along streams V. I.; Duncan; Comox.

4. THALICTRUM (MEADOW RUE)

Tall herbs with 2-3-ternately compound leaves and small, perfect, dioecious, or polygamous flower in panicles; sepals 4-5, petal-like or greenish, deciduous; petals none; fruit a small head of ribbed achenes. (An old name).

Flowers perfect.

Stem scapose, achenes few	1. <i>T. alpinum</i> .
Stem leafy, achenes numerous	2. <i>T. sparsiflorum</i> .
Flowers dioecious or polygamous	
Achenes flattened, 2-edged, leaves thin	3. <i>T. occidentale</i> .
Achenes nearly terete above, leaves firm	4. <i>T. venulosum</i> .

1. **T. alpinum** L. Stem simple and scape-like, 5-20 cm. high, leaves mostly radical; leaflets roundish 1 cm. long, slightly lobed or crenately toothed; flowers in a simple raceme; achenes ovate. Rare, Colorado northward in Rockies. Alaska.

2. **T. sparsiflorum** Turcz. Leaflets thin, roundish, slightly cordate, 3-lobed, sometimes slightly glandular beneath; flowers in long pedicels in a loose panicle; filaments dilated toward the tip; sepals obovate, whitish; achenes 9-15, short-stipitate, obliquely obovate. Rockies, northward; MacLeod's Lake.

3. **T. occidentale** Gray. Stem few-leaved, 6-9 dm. high; leaflets thin, lobed, 1.5-2 cm. long, glaucescent, sometimes glandular-pubescent beneath; flowers on long pedicels in a loose inflorescence, filaments usually purplish; filiform; mature achenes 1-10, lanceolate, 8 mm. long, tapering to a curved, long beak. Woods, V. I. to Rockies; Armstrong; Nanaimo.

4. **T. venulosum** Trel. Glabrous and glaucous, 2-5 dm. high; stems, petioles and sepals often purplish; leaflets firm, suborbicular, whitened and veiny beneath; filaments slender; inflorescence rather close; achenes 6-8, slightly flattened, angled, and tapering to a short, nearly straight beak. Open woods; Kootenay; Glacier.

5. MYOSURUS (MOUSETAIL)

Low, glabrous annuals with a tuft of linear or spatulate basal leaves and solitary scapose flowers; sepals 5, spurred, 2-3 mm. long; petals 5 or none, linear; stamens 5-20; fruit a long slender spike of achenes. (Gk. *mys*, a mouse, *oura*, a tail).

1. **M. apetalus** Gay. Scapes 3-8 cm. high, surpassing the linear, entire leaves; petals often wanting; spike of achenes 6-20 mm. long; achenes carinate, with a spreading beak. Alkaline places, Lytton, eastward.

2. **M. minimus** var. **lepturus** Gray. Similar; about 1 dm. high; leaves linear-spatulate; spikes very slender, 1.5-4 cm. long, surpassing the leaves; beak of achenes short. Wet places, Victoria.

6. RANUNCULUS (BUTTERCUP, CROWFOOT)

Mostly perennials with alternate leaves, and white or yellow flowers; sepals and petals normally 5, the petals usually with a scale at the base; fruit a head of achenes. (Dim. of *rana*, a frog).

Petals white without a basal scale; achenes transversely wrinkled.

(Batrachium).

Receptacle hairy.

Plants with both ordinary and dissected leaves

1. *R. aquatilis*.

Plants with dissected leaves only.

Leaves not collapsing when withdrawn from the water

2. *R. circinatus*.

Leaves collapsing when withdrawn

1a. *R. aquatilis*, var.
capillaceus.
3. *R. Lobbii*.

Receptacle glabrous

3. *R. Lobbii*.

Petals yellow with a scale at base.

Achenes striate, in cylindrical heads; low plants producing runners.

4. *R. cymbalaria*

Achenes not striate.

Aquatic, the immersed leaves dissected.

Achenes conspicuously margined

5. *R. delphinifolius*.

Achenes marginless

6. *R. Purshii*.

Not aquatic, but often in wet places.

At least the basal leaves entire, crenate, or merely toothed.

Leaves linear to lanceolate.

Flowers 1.5-2.5 cm. broad, stems erect, tall and stout

8. *R. alismæfolius*.

Flowers less than 1 cm. broad, stems creeping

7. *R. Flammula*.

Leaves ovate-oblong to orbicular.

Flowers 2 cm. broad, or more.

Achenes pubescent in oblong heads

9. *R. cardiophyllus*.

Achenes glabrous in round heads.

Plant glabrous, petals orbicular.

11. *R. glaberrimus*.

The stem and often the petioles pubescent; petals

oblong

12. *R. ovalis*.

Flowers 1 cm. broad or less, petals oblong

Achenes pubescent, in oblong heads

13. *R. inamœnus*.

Achenes glabrous, in globose heads

14. *R. abortivus*.

All or most of the basal leaves lobed or cleft, but not divided to the base.

Plants glabrous or very slightly pubescent.

Plants creeping.

Achenes minutely beaked

15. *R. hyperboreus*.

Achenes clearly beaked

6. *R. Purshii*.

Plants not creeping, mainly alpine.

Petals not longer than the sepals

16. *R. pygmæus*.

Petals much longer than the sepals.

Head of achenes globose.

Basal leaves lobed

11. *R. glaberrimus*.

Basal leaves cleft

17. *R. Suksdorfii*.

Head of achenes oblong.

Achenes glabrous.

Flowers more than 1 cm. broad

18. *R. Eschscholtzii*.

Flowers less than 1 cm. broad.

19. *R. sceleratus*.

Achenes pubescent

20. *R. saxicola*.

Plants hirsute, or at least the leaves pubescent.

Petals less than 5 mm. long

22. *R. Bongardi*.

Petals more than 8 mm. long

21. *R. occidentalis*.

Root leaves very deeply cleft, or quite divided.

Alpine plants.

Flowers less than 1 cm. broad

23. *R. Grayi*.

Flowers 2-3 cm. broad

24. *R. eximius*.

Plants of middle elevations or of lower levels.

Beak of achenes hooked.

Plants creeping

26. *R. repens*.

Plants not creeping.

Head of achenes globose.

Flowers more than 1 cm. broad

21. *R. occidentalis*.

Flowers less than 1 cm. broad

22. *R. Bongardi*.

Head of achenes oblong

10. *R. pedatifidus*.

Beak of achenes straight or nearly so.

Beak as long as, or longer than the body, petals often

more than 5, radical leaves often pinnate

25. *R. orthorhynchus*.

Beak shorter than the body of the achene.

Petals 4-8 mm. long.

Head of achenes oblong

27. *R. pennsylvanicus*

Head of achenes sub-globose.

Stout, leaves divided

28. *R. Macounii*.

Slender, leaves deeply lobed

6. *R. Purshii*.

Petals more than 1 cm. long.

Divisions of lower leaves sessile

29. *R. acris*.

Terminal division of lower leaves stalked

30. *R. bulbosus*.

1. *R. aquatilis* L. (WATER C.) Glabrous, the floating leaves about 1 cm. broad, deeply 3-lobed, the lobes few-toothed; flowers solitary, on thick peduncles, 5 mm. or more broad; receptacles hairy, achenes minutely beaked. In water, or in places where the water has receded. V. I.; New Westminster; eastward and northward. ♂

Var. *capillaceus* D C. (var. *trichophyllus* Gray). Leaves all under water and mostly petioled, the capillary divisions rather flaccid; 2-4 cm. long; petals 5-7 mm. long. V. I.; eastward across the Continent; Alaska.

2. *R. circinatus* Sibth. Leaves all submerged and dissected, the divisions short, spreading, rather rigid, sessile with broad stipules, 1-2 cm. long; flowers 6-10 mm. broad; achenes beakless. Across the Continent. Agassiz; Kamloops; Cranbrook.

3. *R. Lobbii* Gray. Glabrous, 1-3 dm. high; leaves deeply 3-cleft, the middle segment entire, the lateral notched; submerged leaves none or rudimentary; flowers 5-6 mm. broad, on thick peduncles; stamens 5-9, receptacle glabrous; achenes enclosed by the persistent calyx. Near Victoria.

4. *R. cymbalaria* Pursh. (SEA-SIDE C.) Glabrous, or the scapes and petioles pubescent; scapes 5-15 cm. high, 1-7-flowered; leaves basal, or at the rooting nodes of the often long creeping stems, round or ovate, coarsely crenate; petals 5-8, 3-5 mm. long; carpels striate, in a round head. Sea shores and alkaline places in the interior; Alaska.

5. *R. delphinifolius* Torr. Stems floating or immersed; the leaves dissected into filiform segments, or sometimes creeping in mud; petals 5-8, about 1 cm. long, much exceeding the sepals; carpels in a round head, with a short, straight beak, and a corky-margined border. (*R. multifidus* Pursh.) Rockies; Okanagan Valley; Bonaparte River.

6. *R. Purshii* Richards. Immersed and glabrous, if on mud without dissected leaves; leaves 3-5 cleft, 10-25 mm. broad, the segments cuneate or oblong, the immersed dissected; flowers about 1 cm. broad, petals not much exceeding the sepals; carpels without a border in a round head, beak short, nearly straight. Lower slopes of Rockies northward; New Westminster; Alaska.

7. *R. Flammula* var. *reptans* Mey. Stems slender to filiform, creeping, rooting at the nodes; leaves linear to lance-spatulate, 2 cm. long, or less; petals about 3-5 mm. long; achenes short-pointed. Ditches and wet ground, Atlantic to Pacific; Alaska. Passing into the var. *unalaschensis* Bess. (*R. Flammula* var. *intermedius* Hook). Leaves lanceolate, 2-5 cm. long. Rockies, Victoria.

8. *R. alismæfolius* Geyer. Stout, 3-6 dm. high, glabrous or nearly so, from thickened fibrous roots; leaves lanceolate, often 1.5 dm. long, the upper sessile, the lower petioled; flowers corymbose, large light-yellow; petals obovate; achenes short-beaked, in a globose hood. Wet places, Victoria.

9. *R. cardiophyllus* Hook. More or less pubescent and succulent; 1-3 dm. high; basal leaves round to ovate or cordate, crenate or lobed, the cauline divided into broadly linear lobes; flowers rather large, the petals twice as long as the calyx lobes; achenes pubescent in an oblong head; beak short; differing from the following in the merely crenate or slightly lobed leaves, and in texture. Rockies.

10. *R. pedatifidus* Smith. Softly pubescent, not succulent, 1-4 dm. high; the radical leaves orbicular, deeply many-lobed; the cauline with long broadly linear divisions; flowers 1-1.5 cm. broad; the calyx and the apex of the long peduncles almost tomentose; achenes more or less pubescent, with a short hooked beak. (*R. affinis* R. Br.) Rockies.

11. *R. glaberrimus* Hook. Glabrous, less than 1 dm. high, from thickened root-fibres; stems 1-few flowered; leaves thick, the lower orbicular with 3 short or long blunt lobes; petals orbicular-obovate, twice as long as

the obtuse glabrous sepals; achenes short-beaked. Flowering very early. Plains east of the Cascades; Lytton.

12. *R. ovalis* Raf. Low, 0.8-2 dm. high, nearly glabrous; basal leaves thickish, oval to rhombic or oblong, entire, or slightly lobed, with a few large crenate teeth; the cauline narrower, entire or deeply oblong-lobed, the lobes entire; petals large, oblong, carpels short-beaked, in a globose head. Kamloops to Rockies.

13. *R. inamœnus* Greene. Sparsely hairy, 1-3 dm. high; radical leaves short-petioled, obovate-flabelliform, crenately toothed or 3-lobed at summit, or sometimes 3-cleft to base; cauline sessile, once or twice ternately divided into oblanceolate segments; peduncles short, slender, solitary, or several and subumbellate; corolla 6-10 mm. broad; the 5 small petals obovate-oblong; head of pubescent achenes oblong-cylindrical. Banff; Crow's Nest Pass.

14. *R. abortivus* L. Biennial, slightly succulent, stem 3-5 dm. high, sparsely pubescent; root-leaves cordate, with a broad, shallow sinus, cuneate or slightly lobed; the cauline 3-5-parted; petals pale, shorter than the small, reflexed calyx; receptacle villous; carpels minute, mucronulate. Armstrong; Creston.

15. *R. hyperboreus* Roth. (ARCTIC BUTTERCUP). Glabrous, stems filiform, 1 dm. or less long; leaves 3-lobed, the lobes usually entire; ovate, 4-8 mm. broad; peduncles 8-12 mm. long; flowers few, 5 mm. broad, the petals shorter than the sepals; head of fruit globose; achenes with a minute, blunt point. Arctic regions, southward in Rockies.

16. *R. pygmæus* Wahl. Dwarf, 2-5 cm. high, leaf-blades glabrous, lobed to the middle or more deeply, the lobes obtuse, the petioles glabrous or slightly pubescent; 1-flowered, sepals obtuse, pubescent, becoming brown and reflexed; head of achenes ovate-oblong; the style hooked. Rockies; Lake Louise; Alaska.

17. *R. Suksdorffii* Gray. Similar, glabrous, leaves subreniform-flabelliform, the divisions of the cauline linear; petals round obovate; achenes in a small, globular head; style long, slender. Alpine, Rockies.

18. *R. Eschscholtzii* Schlecht. (Mt. B.) Nearly glabrous, or the leaves ciliate and the calyx pubescent; 1-3 dm. high, leaves slightly fleshy, the radical often divided nearly to the base, the uppermost with about 5 long entire lobes; flowers 1 to few, about 2 cm. broad; the sepals greenish yellow, reflexed, not half as long as the petals; achenes in an oblong head, 1 cm. long or more, plump, abruptly contracting to a short, slender beak. Alaska to Wn. This includes *R. alpeophilus* A. Nels, which has leaf-margins barely ciliate, calyx nearly or quite glabrous; basal leaves broader and not very deeply lobed; corolla deeper yellow; and achenes with a broader summit. Plants from the Coast and Cascade Mts. appear to belong to the former; those from the Rockies to both, but mainly, in the south, at least, to the latter.

19. *R. sceleratus* L. (CURSED B.) Erect or ascending annual, 2-5 dm. high, glabrous, (an occasional plant pubescent); leaves light green, 3-5-lobed, the sinuses round or acute, the lobes about 3-lobed; stem leaves petioled; flowers 8-10 mm. broad; achenes in an oblong head; the receptacle becoming inflated, more or less pubescent; achenes marginless. Margins of ponds, ditches; Salmon Arm; Okanagan Valley eastward.

20. *R. saxicola* Rydb. About 1 dm. long, decumbent or ascending; leaves ciliate, the radical round to reniform-flabellate, 3-cleft, the middle lobe narrow, the lateral oblique, all more or less toothed; the cauline divisions linear; flowers 1-2 cm. broad; sepals tinged with brown, very broad; head of achenes oblong, 5-10 mm. long; achenes more or less pubescent, with a straight style. Among stones and rocks, Rockies; Yoho; Glacier.

21. **R. occidentalis** Nutt. (WESTERN B.) Pilose, 2-5 dm. high, rather slender; radical leaves subcordate, 3-lobed or 3-parted, coarsely toothed, about 3 cm. broad, the lobes of the upper leaves linear-lanceolate, entire; petals oblong, about 1 cm. long; achenes margined in a globose head. V. I., and west of the Cascades.

22. **R. Bongardi** Greene. Winter annual, sparingly pubescent to nearly smooth, stem often glaucous, 3-6 dm. high; leaves often with a brown spot, 2-4 cm. broad, deeply 3-lobed, the lobes 3-lobed and coarsely toothed; the lobes of the upper stem leaves narrow and entire, or reduced to single linear-lanceolate bracts; flowers 5 mm. broad, petals 3-5, very small, mostly 3 and unequal. Achenes smooth, with a hooked beak, in small, globose heads. V. I. to Rockies, and Alaska; Vancouver. Var. **Greenei** Piper. Hirsute throughout with often fulvous hairs, or the stems becoming smooth above; leaves 2-10 cm. broad, often with a large brown spot in the middle; achenes more or less hispid. Very common west of the Cascades and on V. I.; Revelstoke; Armstrong; Alaska.

23. **R. Grayi** Brit. Low, 1 dm. or less high; the primary divisions of the radical leaves often petiolulate, the lobes linear-oblong to spatulate; stems 1-2 flowered, petals about 5 mm. long; achenes subglobose, beak subulate in a subglobose head. Summits of Rockies, rare.

24. **R. eximius** Greene. Stems pubescent, 1-2 dm. high; radical leaves usually deeply 5-7 lobed or divided; leaves few, often only 1, on short, stout petioles; the cauline sessile, cleft to the middle or below into broadly linear lobes; flowers 2.5-3 cm. broad, the obovate petals overlapping each other; achenes ovoid, in an ovoid head. Dry open valleys, Rockies.

25. **R. orthorhynchus** Hook. Hirsute-pubescent; erect or ascending, 3-6 dm. high; leaves pinnate, leaf-divisions 5-7, the segments linear to cuneate obovate, rather small, 2-3-toothed or lobed; petals oblong, often more than 5, yellow, brownish-purple at base, or purplish beneath, 2-3 cm. broad; achenes comparatively few, the body and beak 6-8 mm. long. Victoria; rare about Vancouver, and eastward. Var. **platyphyllus** Gray. Leaf segments large, 2-6 cm. long, obovate to oblong, cleft into 3-9-toothed segments. Victoria, and probably on the Idaho boundary.

26. **R. repens** L. (CREEPING B.) Hairy, spreading by runners and forming patches; leaflets 3-foliate, all lobed $\frac{1}{3}$ to $\frac{2}{3}$ the way to the base; at least the terminal divisions of the root-leaves stalked; leaves often faintly marked with white spots; flowers 2-2.7 cm. broad; the sepals not reflexed. Very common V. I. and west of the Cascades; Atlantic to Pacific.

27. **R. pennsylvanicus** L. Stout and tall, hirsute, 3-9 dm. high; the foliage (at the Coast at least) light-green, leaves 3-foliate, the leaflets all stalked, unequally 3-cleft, and sharply cut; petals small, about equaling the reflexed sepals; the short-beaked achenes in a cylindrical head 12-17 mm. long. Lulu Is.; Chilliwack; V. I.

28. **R. Macounii** Brit. Stems erect or ascending, often rooting at the nodes, 4-9 dm. high; hirsute to glabrous, but usually hairy; leaves in 3 deeply lobed, stalked segments; petals 5-8 mm. long, calyx hardly reflexed, soon deciduous; achenes short-beaked, in a globose or ovoid head. Fraser Valley, Kelowna, Rockies. (**R. oreganus**, a very closely related species, erect, less pubescent to glabrous, sometimes occurs with *R. Macounii*, which should probably be regarded as a var.)

29. **R. acris** L. (TALL B.) Hairy, erect, 6-9 dm. high; leaves round, 3-cleft or parted, the divisions much cut into narrow lobes; flowers 2.5 cm. broad; sepals spreading. Introd. everywhere along the railways.

30. **R. bulbosus** L. (BULBOUS B.) Hairy, 3 dm. high; radical leaves 3-divided, the lateral divisions sessile, the terminal stalked, deeply 3-lobed; flowers 2-2.5 cm. broad; the sepals reflexed; the carpels tipped with a very short beak. Introd. not common. Revelstoke.

7. *CALTHA* (MARSH MARIGOLD)

Glabrous marsh plants, with thick cordate leaves, and whitish or yellow flowers; sepals 5 or more; petals none; fruit several follicles. (*Gk. kalathos*, a goblet, in allusion to the shape of the flower).

Flowers yellow, sepals obovate	1. <i>C. asarifolia</i> .
Flowers whitish or bluish, sepals oblong.	
Leaves broader than long	2. <i>C. biflora</i> .
Leaves orbicular or oblong.	
Leaves obtuse	3. <i>C. leptosepala</i> .
Leaves acutish	4. <i>C. chelidonii</i> .

1. *C. asarifolia* DC. (YELLOW M.) Stout, 3 dm. or more high; stems erect or decumbent, bearing 2 or more leaves, often branching; lower leaves reniform-orbicular, 5-12 cm. broad, slightly crenate to entire; flowers yellow, usually several, 3-4 cm. broad. In water or wet meadows. Comox; Lower Fraser, and eastward; Alaska.

2. *C. biflora* DC. Leaves numerous, 3.5-7.5 cm. broad, long-petioled, erect, the blade round-reniform with a closed sinus, regularly crenate, the cauline leaf below the middle with a broad, clasping stipule; the two peduncles very unequal; filaments filiform; sepals 6-10, oblong, 4 times as long as the anthers. Alaska to Wash.; rare in southern British Columbia.

3. *C. leptosepala* DC. (MOUNTAIN M.) Plants 1-4 dm. high; the stem usually with a single leaf with or without a peduncled flower in its axils; leaves ovate to oblong, or orbicular, very obtuse, the blades 3-7 cm. long, with long or short petioles, entire or slightly crenate, cordate; flowers usually 1 or 2, 2.3-3.3 cm. broad; the sepals 6 or more, oblong, white, or usually tinged with blue on the outside. (*C. Macounii* Greene). Wet alpine meadows, V. I. to Rockies; Alaska.

4. *C. chelidonii* Greene. Dwarf 0.5-1 dm. high; leaves all round-cordate with open sinus, the petiole little longer than the blade, acutish, slightly crenate, 2.5 cm. long or less, the cauline leaf not small, rather long petioled, near the base, its axillary peduncle about one-half as long as the terminal, its stipules somewhat lunate. A little-known species. Yellow-Head Pass.

8. *TROLLIUS* (GLOBE FLOWER)

Perennials with palmately parted leaves like those of the Buttercup, thick, fibrous roots, and large, terminal, solitary flowers; sepals 5-15, petal-like; petals inconspicuous; carpels several, forming follicles. (Latinized form of the German name).

1. *T. laxus* Salisb. Stout, 2-6 dm. high; leaves very deeply parted, the uppermost sessile; sepals 5-6, orbicular, creamy; petals 15-25, concealed by the stamens; follicles 3-6-seeded. Mts., Cascades to Rockies; Roger's Pass; Strathcona Park, V. I.

2. *T. albiflorus* Rydb. Similar, slender, 1-2 dm. high; sepals white, or tinged pink. Lake O'Hara; Glacier.

9. *AQUILEGIA* (COLUMBINE)

Tall perennials with 2-3-ternately compound leaves; sepals 5, colored like the petals; petals 5, all spurred; carpels 5 with slender styles; follicles erect, many-seeded, surrounded when young by a membranous sheath of modified stamens. (*L. aquila*, an eagle, referring to the spurs of the flowers).

Flowers red and yellow	1. <i>A. formosa</i> .
Flowers yellow	1a. <i>A. f.</i> var. <i>flavescens</i> .
Flowers blue	2. <i>A. brevistylis</i> .

1. *A. formosa* Fischer. Glabrous, excepting a fine pubescence above, 5-10 dm. high; leaves 2-3 ternate, the segments round-obovate, deeply cleft and crenate; flowers red without, yellowish within, the limb of the petals

3-6 mm. long, yellow; spurs contracting to the middle, 12-20 mm. long, shorter than the sepals; follicles pubescent. (*A. columbiana* Rydb). Common, Coast to Rockies; Alaska southward to Wash.

1a. Var. *flavescens* (Wats). Frye & Rigg. Sepals yellow, or tinged with pink, which intensifies in drying. Selkirks and Rockies; Arrowhead; Mt. Stephen.

2. *A. brevistylis* Hook. Slender, 3-6 dm. high; leaves biternate, the leaflets lobed; flowers small, 1.5 cm. long or more; sepals blue; petals whitish with a short blue spur 6-8 mm. long; styles and stamens hardly exceeding the petals. Rocky places. Banff to Telegraph Trail.

10. ACTÆA (BANEERRY)

Tall perennials with 2-3-ternate leaves; flowers white, in short racemes; petals 4-10; stigma 2-lobed; fruit a berry. (An ancient name).

1. *A. arguta* Nutt. Nearly glabrous, 6-9 dm. high, branching; leaflets thin, sharply incised with acute teeth; flowers white in a short cylindrical raceme, which elongates in fruit; berries subglobose, red, 5-7 mm. long; seeds 3 mm. long. Thickets, Coast to Rockies; Alaska.

2. *A. eburnea* Rydb. Similar; fruit white, ellipsoidal, 9-12 mm. long, seeds about 4 mm. long. Same range.

11. PÆONIA (PEONY)

Low herbs with tuberous roots; much-dissected leaves, and large solitary flowers; petals 5 or more, inserted with the stamens on a fleshy perigynous disk; carpels few, becoming coriaceous, sessile follicles. (A Greek name).

1. *P. Brownii* Dougl. Glabrous and glaucous; stems ascending, 3-6 dm. long; leaves thick, in linear-oblong lobes; petals red, thick, scarcely longer than the green calyx. Assigned to Mountains of V. I. but not collected recently.

12. COPTIS (GOLD THREAD)

Low, evergreen perennials, with yellow rootstocks; sepals 5-7, white, 4-5 mm. long; petals 5-7, filiform, enlarging at apex or middle; follicles 3-12, stipitate. (Gk. *koptein*, to cut, in allusion to the leaves).

1. *C. trifoliata* Salisb. Leaflets 3, obovate, with a wedge-shaped base, shining, sharply toothed, obscurely 3-lobed; scape 1-flowered; sepals oval; petals club-shaped; follicles equaling the stipe. Deep woods, North Vancouver; Mt. Mark, V. I.; northward.

2. *C. asplenifolia* Salisb. Leaves pinnately 5-foliolate, much dissected; scape 1-3-flowered; sepals linear, whitish; petals enlarged near the middle; follicles shorter than the stipe. Deep woods, Uclulet, V. I.; Comox; New Westminster; and northward.

13. CIMICIFUGA (BUGBANE)

Tall perennials with 2-3-ternate leaves, the leaflets cut-serrate, and small, white flowers in wand-like racemes; sepals 4-5, deciduous; petals small or none; stamens with white filaments. (*L. cimex*, a bug; *fugere*, to drive away).

1. *C. elata* Nutt. Pubescent to tomentose, and glandular above; 12 dm. high; leaflets thin, 5-10 cm. broad; carpels 1-5; follicles 8 mm. long, sessile. Mt. Cheam; only Canadian reference.

14. DELPHINIUM (LARKSPUR)

Tall herbs with palmately lobed leaves and racemose, blue flowers; sepals 5, petal-like, one of them spurred; petals 4, the two upper with spurs enclosed in the spur of the sepal; fruit 3-5 follicles; many of the species are poisonous. (*Delphin*, a dolphin, in allusion to the shape of the flowers).

Introduced annuals	1. <i>D. Ajacis</i> .
Native perennials.	
Roots elongate, fascicled, not tuber-like.	
Lower pedicels longer than the flowers	2. <i>D. bicolor</i> .
Lower pedicels shorter than the flowers.	
Leaves puberulent	3. <i>D. Brownii</i> .
Leaves glabrous	4. <i>D. glaucum</i> .
Roots forming irregular tubers	
Peduncles longer than the flowers.	
Mature follicles spreading at apex	5. <i>D. Menziesii</i> .
Mature follicles contiguous	6. <i>D. columbianum</i> .
Peduncles shorter than the flowers	7. <i>D. simplex</i> .

1. *D. Ajacis* L. Leaves dissected into narrow linear lobes; inflorescence loosely spicate, pedicels shorter than the spur; follicle solitary, pubescent, Mayne Island.

2. *D. bicolor* Nutt. Pubescent above, glabrate or glabrous below, 2-5 dm. high; roots fascicled, thick, sometimes elongated; leaves thickish, with linear segments; racemes few-15-flowered; spur 15-18 mm. long, slender; the upper petals with a brownish-yellow border, flowers mostly lighter blue and with more slender spurs than those of *D. Menziesii*, from which it is distinguished by the elongate roots, and the slighter pubescence; follicles pubescent. Lytton to Rockies.

3. *D. Brownii* Rydb. Tall, 6-15 dm. high; stem glabrous, leaves pubescent, with narrower segments than those of *D. glaucum*; flowers rather loose on almost erect pedicels, 1-2 cm. long, dark blue or purplish; spur short and thick, 1 cm. long; follicles glabrous. Alaska southward to Banff; Emerald Lake.

4. *D. glaucum* Wats. Tall, 6-15 dm. high, glabrous and glaucous; leaves laciniately lobed and toothed, the divisions rather broad; flowers rather dense, pale blue, on short spreading or ascending pedicels; inflorescence (except the sepals) glabrous, follicles glabrous; very poisonous. Alaska to Wash. in the eastern part of the province.

5. *D. Menziesii* DC. Usually pubescent throughout, the whole stem with spreading, hirsute pubescence, 1-6 dm. high; roots thick, short, tuber-like; leaves thickish, deeply cut into oblong segments, the upper linear; flowers deep blue or purplish, upper petals white or bluish, glabrous, the lower hairy; spur 10-16 mm. long; raceme 1-15-flowered; pedicels spreading or ascending; follicles pubescent, finally spreading. Apparently harmless, at least in the case of sheep. The coast form, V. I., and sand pits on the mainland. Specimens from the Rockies have the upper petals brownish or yellowish as in *D. bicolor*.

6. *D. columbianum* Greene. Stems glabrous below, velvety above, tall and leafy; leaf-segments cleft into narrowly oblong lobes; flowers 10-20, about 2 cm. long, raceme 3-6 cm. long, rather small, on pedicels 1-2 cm. long; spur not strongly tapering; follicles pubescent, erect or only spreading at the tips. Oregon to Alaska; Banff.

7. *D. simplex* Dougl. Stems 3-9 dm. high, strict or branching above, velvety-pubescent above; leaves closely short-pubescent, in many oblong or linear divisions; raceme 1-2 dm long, dense, flowers about 1.5 cm. long, light blue, the upper petals hirsute, the sepals velvety; pedicels 3-6 mm. long, follicles densely tomentose. Midway; near the mouth of the Kootenay River.

15. ACONITUM (MONKSHOOD)

Perennials with palmately lobed leaves and large blue flowers in showy terminal spikes; sepals 5, the upper one large, hooded; petals 5, the upper 2 spur-like concealed within the hood, the lower 3 small or wanting; follicles 3-5.

1. *A. columbianum* Nutt. Stout, 6-12 dm. high; leaves laciniately toothed and lobed; flowers blue, pale, or nearly white, in an open few-flowered raceme; poisonous. Hope, Princeton Trail, Skeena Valley.

BERBERIDACEÆ (BARBERRY FAMILY)

Shrubs or herbs with compound leaves and perfect, hypogynous flowers; the 6 sepals and 6 petals, both colored, in 2 rows of 3 each, usually with 6 bracts; stamens 6 (9 or more in *Achlys*), the anthers dehiscent by valves winged at the top; carpel 1, style short or none.

Shrubs, leaves evergreen, pinnate	1. <i>Berberis</i> .
Herbs, leaves deciduous, not pinnate	2. <i>Achlys</i> .
Flowers spicate	3. <i>Vancouveria</i> .
Flowers panicled	

1. BERBERIS (BARBERRY)

Shrubs with yellowish wood, flowers in clustered terminal racemes and blue, very acid, berries; stamens 6, in front of the petals, sensitive; sepals yellow, with 3 or 4 colored subtending bracts. (The Arabic name).

Leaflets palmately 3-5 veined, often 13	1. <i>B. nervosa</i> .
Leaflets pinnately veined	
Leaflets 5-11 shining, strongly spinulose	2. <i>B. aquifolium</i> .
Leaflets 3-7 dull, weakly spinulose	3. <i>B. repens</i> .

1. *B. nervosa* Pursh. (OREGON GRAPE). Stems simple, 3-6 dm. high; leaflets 5-15, or on young plants 1-3; serrate, strongly spinulose, ovate-lanceolate; racemes long; petals 2-lobed; filaments hornless. Dry thickets, V.I. to Cascades.

2. *B. aquifolium* Pursh. (MAHONIA, TALL OREGON GRAPE). Branching, 2 dm-2 m. high; leaflets ovate-oblong, coarsely serrate, strongly spinulose, shining above; racemes medium; petals entire or erose, filaments with 2 reflexed horns. Dry thickets and rocky places, V. I. to Rockies.

3. *B. repens* Lindl. Branching, 2-6 dm. high, erect; leaflets ovate, more finely serrate than in No. 2, weakly spinulose, slightly shining above; raceme 3-6 cm. long, filaments horned. Rocky places, Kootenay.

2. ACHLYS

Glabrous herbs with one large trifoliate leaf, and a spicate bractless inflorescence of small white flowers, destitute of calyx and corolla; stamens 9 or more, the outer filaments dilated at the apex; style none; fruit at first fleshy, becoming dry. (Greek *achlys*, mist, in allusion to the inflorescence).

1. *A. triphylla* DC. (MAY LEAVES). Leaflets sinuate margined, fragrant in drying, on petioles 3-4 dm. long; scape solitary, usually exceeding the leaves, from a rootstock. Woods, V. I. and Coast. When growing in the open the leaves are often purplish beneath, and set themselves in a vertical plane at right angles to the meridian.

3. *Vancouveria hexandra* M. & C. A pubescent herb, with 2-3-ternately compound leaves, and flowers on pedicels 2 cm. long, is said to occur on V. I.

PAPAVERACEÆ (POPPY FAMILY)

Herbs usually with milky juice, and opposite or alternate leaves without stipules; flowers hypogynous, regular, the parts in 2's or 4's, sepals 2, fugacious; petals 4-12, deciduous; stamens 4-many (usually many); capsule 1-celled, with parietal placentæ.

Leaves opposite or whorled, entire	1. <i>Platystigma</i> .
Leaves alternate, lobed or dissected	
Sepals united into a narrow cap; capsule linear	2. <i>Eschscholtzia</i> .
Sepals not united; capsule subglobose	3. <i>Papaver</i> .

1. PLATYSTIGMA

Low annuals without milky juice, with relatively long peduncles; sepals 2; petals 6; stamens 4-12; sigmas 3, short, but not united; parietal placentæ 3; seeds smooth and shining. (Greek *platys*, flat).

1. *P. oreganum* Wats. Smooth, 2.5-5 cm. high, simple, or branching from the base, radical leaves spatulate, not more than 6 mm. long; petals white,

2-3 mm. long, expanding at night, stamens 4-6. Wet places where water lies in Spring; Victoria.

2. ESCHSCHOLTZIA

Glabrous herbs with colorless juice, or that of the root red, and finely dissected leaves; sepals 2, united into a conical hood which encloses the petals in bud; petals 4; stamens many, ovary 1-celled, styles 4-6, united below, capsule elongated. (Eschscholtz was a German botanist).

1. *E. californica* Cham. Flowers yellow, but varying in color, 5 cm. wide or more. Garden escape, Victoria.

3. PAPAVER (POPPY)

Herbs with juice; ovary incompletely many-celled by the projecting placentæ; stigmas united into a radiate crown; pod opening by chinks under the stigma.

1. *P. alpinum* L. (ARCTIC P.) Tufted perennial, more or less hispid-hirsute; stems scapose, less than 1 dm. high; leaves deeply lobed or parted; petals about 1 cm. long, yellow or white; capsule hispid. Alpine, Rockies and northward. (*P. nudicaule*, *P. pygmæum*).

2. *P. somniferum* (OPIUM P.) Annual, solitary, 2 dm. high or more, glabrous or hispid above; leaves glaucous and glabrous, clasping, slightly lobed or dentate; petals large, purplish, darkest in the middle. A garden escape, New Westminster, etc.

FUMARIACEÆ

Tender herbs with watery juice, dissected leaves and irregular, hypogynous flowers 1-2 spurred at base, the parts in 2's; stamens 6, diadelphous; ovary 1-celled with 2 parietal placentæ; sepals 2, small; corolla flattened and closed, the 4 petals in 2 pairs, the inner pair with tips united over the stigma.

Both outer petals spurred	1. <i>Dicentra</i> .
Only 1 petal spurred	2. <i>Corydalis</i> .

1. DICENTRA (BLEEDING HEART)

Stemless perennials; petals slightly cohering into a heart-shaped corolla; the middle stamen of each group 2-celled, the others 1-celled; seeds crested. (Greek *di*, twice, *kentron*, a spur).

1. *D. formosa* DC. Scapes 2-4 dm. high, from a scaly rootstock, leaf divisions pinnatifid; flowers reddish in a compound raceme, petals narrow and united below; pod 2.5-3 cm. long, terete; seeds black, white-crested. Rich woods, Coast.

2. *D. uniflora* Kell. Scapes 5 cm. high, from fusiform tuberous-roots; leaves with 3-7 pinnatifid divisions; flowers 1 or 2, pink; the outer pair of petals with strongly recurving tips, the inner pair dilated and hastate at base. Rossland.

2. CORYDALIS

The deciduous corolla 1-spurred at base; flowers in simple or panicked racemes; otherwise as in *Dicentra*. (Greek name for the crested lark).

Flowers purplish or rose, with yellow tips	1. <i>C. sempervirens</i> .
Flowers yellow	2. <i>C. aurea</i> .

1. *C. sempervirens* Pers. (PALE C.) Erect, glaucous, 2-8 dm. high; racemes panicked; spur stout, short, 3 mm. long; pods erect, 3-4 cm. long (*C. glauca* Pursh.) Rocky places and clearings, Vancouver; Revelstoke; northward.

2. *C. aurea* Willd. (GOLDEN C.) More or less decumbent, glaucous 1-4 dm. high, racemes solitary; corolla 1-2 cm. long, spur more slender than in No. 1, 3 mm. long; pods pendulous, becoming torulose; seeds obtuse-margined. Rocky places and clearings, Vernon; Princeton; northward. Var. *occidentalis* Engelm. Flowers rather larger, spur nearly as long as the body, pods on short pedicels, seeds acutish on the margin. V. I.; Kamloops; Vernon.

CRUCIFERÆ (MUSTARD FAMILY)

Herbs, petals 4, stamens 6 (sometimes 4 or 2) tetradynamous; sepals 4, deciduous; pod usually 2-celled by a thin partition stretched between the marginal placentæ, either longer than broad (a silique), or short (a silicle); flowers in terminal racemes; seeds few to many, the cotyledons *accumbent*, i.e., their margins on one side applied to the radicle (the embryo in cross-section thus $o =$); or *incumbent*, the back of one cotyledon applied to the radicle (in cross-section thus $0 ||$); or *conduplicate*, the radicle enfolded by the cotyledon, (in cross-section thus $o \gg$). The classification depends largely on the mature fruit. Strictly there are no compound leaves in this family; but the term, leaflet, is frequently used for convenience rather than leaf-segment.

Pods compressed contrary to the narrowed partition.

Pubescence stellate.

- | | |
|------------------------------|----------------|
| Pods much inflated | 1. Physaria. |
| Pods not inflated | 2. Smelowskia. |

Pubescence, if any, not stellate.

Cells 1-seeded.

- | | |
|-----------------------------|---------------|
| Pods wrinkled | 3. Coronopus. |
| Pods not wrinkled | 4. Lepidium. |

Cells with several seeds.

- | | |
|---|----------------|
| Pods 1 cm. long, winged at apex | 5. Thlaspi. |
| Pods 4-5 mm. long not winged at apex. | |
| Pods triangular-obcordate | 6. Capsella. |
| Pods elliptical | 7. Hutchinsia. |

Pods not compressed contrary to the partition.

Pods 1-2.5 times longer than broad.

Pods indehiscent.

- | | |
|---|------------|
| Pods globose, flowers yellow. (Flowers purple, No. 26). | 8. Neslia. |
|---|------------|

Pods flat, circular, flowers white.

- | | |
|---|--------------------|
| Pod not winged, pubescence stellate | 9. Athysanus. |
| Pod winged, pubescence not stellate | 10. Thysanocarpus. |

Pod dehiscent.

- | | |
|--------------------------------------|----------------|
| Plants growing under water | 11. Subularia. |
|--------------------------------------|----------------|

Plants terrestrial.

Pods compressed parallel to the partition.

- | | |
|----------------------------|--------------|
| Pods 3 cm. broad | 12. Lunaria. |
|----------------------------|--------------|

Pods much narrower.

- | | |
|--|----------------|
| Basal leaves 8 cm. long, pod slightly turgid | 20. Nesodraba. |
|--|----------------|

Basal leaves short, pod not turgid.

- | | |
|--------------------------------|------------|
| Pods ovate or oblong | 21. Draba. |
|--------------------------------|------------|

Pods orbicular.

- | | |
|-------------------------------|--------------|
| Pubescence stellate | 13. Alyssum. |
|-------------------------------|--------------|

Pubescence of hairs attached by the middle

- | | |
|---|----------------|
| Pod globose or ovoid, little if at all compressed | 14. Lobularia. |
|---|----------------|

Pubescence stellate

Pubescence not stellate.

Flowers yellow.

- | | |
|-------------------------------------|---------------|
| Pod margined, pear-shaped | 16. Camelina. |
|-------------------------------------|---------------|

Pod not margined, ovoid-oblong

- | | |
|-------------------------|-----------------|
| Flowers white | 17. Radicula. |
| | 19. Cochlearia. |

Pods much longer than broad.

Pods flat, compressed parallel to the partition.

Valves nerveless.

- | | |
|---|---------------|
| Flowers pink, large; seeds in 1 row | 18. Dentaria. |
|---|---------------|

Flowers white, or yellow, mostly small.

Pods long, seeds often in 1 row.

- | | |
|--|----------------|
| Valves opening elastically, seeds wingless | 23. Cardamine. |
|--|----------------|

Valves not opening elastically, seeds often winged

- | | |
|--|------------|
| Pods short, 1.5 cm. long, or less, seeds in 2 rows, valves not opening elastically | 21. Draba. |
|--|------------|

Valves nerved.

Pods more or less torulose.

- | | |
|-----------------------------------|------------------|
| Pod stipitate, glabrous | 24. Thelypodium. |
|-----------------------------------|------------------|

Pod not stipitate, pubescent

Pods not torulose.

- | | |
|--------------------------------------|------------|
| Pods 1.5 cm. long, or less | 21. Draba. |
|--------------------------------------|------------|

Pods usually exceeding 2 cm.

Pods terete or tetragonal, not compressed.

Pods indehiscent, more or less beaked.

- | | |
|---|-------------|
| Pods transversely 2-jointed, seeds 2. | 26. Cakile. |
|---|-------------|

Pods not 2-jointed, seeds several.

- | | |
|--|---------------|
| | 27. Raphanus. |
|--|---------------|

- Pods dehiscent.
 Pods with a stout beak 28. *Brassica*.
 Pods beakless, merely tipped with the style.
 Pods terete.
 Seeds in 2 rows in each cell.
 Valves of short pod nerveless 17. *Radicula*.
 Valves of elongated pod nerved.
 Seeds flat, pod more than 3 cm. long 22. *Arabis glabra*.
 Seeds plump, pod less than 3 cm. long; leaves pinnate or pinnatifid. 29. *Sisymbrium*.
 Seeds in 1 row in each cell.
 Flowers purple 30. *Hesperus*.
 Flowers yellow or white 29. *Sisymbrium*.
 Pods 4-angled by a strong midrib.
 Leaves lyrate 31. *Barbarea*.
 Leaves not lyrate.
 Leaves entire, pubescence appressed 32. *Erysimum*.
 Leaves various, pubescence, if any, spreading 29. *Sisymbrium*.

1. PHYSARIA (MOUNTAIN BLADDER-POD, TWIN POD)

Low, stellately canescent perennials with simple leaves and yellow race-mose flowers; the two cells of the pod much inflated, thin and papery. (Gk. *physa*, a bladder).

1. *P. didymocarpa* Gray. Stems several, 10-15 cm. high, with linear or very narrowly spatulate leaves; basal leaves ovate-orbicular, 1 cm. long, on petioles twice as long, entire, or sinuately toothed, densely canescent. Dry ground, Columbia Valley; Rockies.

2. SMELOWSKIA

Low, tufted, canescent perennials, with well developed roots, and pinnate leaves; pods somewhat 4-angled, hardly twice as long as the sepals, slightly compressed laterally, the valves keeled. (Named for some Russian).

1. *S. americana* Rydb. About 1 dm. high; leaf blades pinnate or pinnatifid, shorter than the petiole, 2-3 cm. long; racemes 1 to several; flowers white. Alpine; crevices of rocks, Cascades to Rockies; Mt. Cheam; Alaska.

3. CORONOPUS (WART-CRESS)

Low, prostrate annuals, with minute white flowers, and often only 2 stamens; pods flattened contrary to the narrow partition, the cells wrinkled, 1-seeded. (Gk. *korona*, a crown, and *pous*, a foot, in allusion to the cleft leaves).

1. *C. didymus* (L.) Sm. Glabrous; leaves 1-2-pinnately parted; flowers in racemes; pods 2 mm. broad; plants with a peppery odor. Introd., Nanaimo.

4. LEPIDIUM (PEPPERGRASS)

Low annuals, or biennials; petals white, small, or wanting; stamens 2, 4 or 6; pod orbicular, the apex usually notched; cotyledons incumbent. (Gk. *lepidion*, a little scale).

- Stem-leaves clasping.
 Pod winged at apex. 1. *L. campestre*.
 Pod wingless 2. *L. Draba*.
 Stem-leaves not clasping.
 Lower leaves bi-pinnatifid, glabrous, stamens 6 3. *L. sativum*.
 Leaves not bi-pinnatifid, stamens 2-4.
 Leaves hirsute, pinnately parted 4. *L. Menziesii*.
 Leaves pubescent to glabrous, not pinnately parted.
 Pods barely notched at apex, lower leaves and stem puberulent. 5. *L. strictum*.
 Pods notched at apex, lower leaves and often the lower part of the stems glabrous
 Petals wanting 6. *L. apetalum*.
 Petals present 7. *L. medium*.

1. *L. campestre* (L.) R. Br. (FIELD CRESS). About 3 dm. high, branching, puberulent throughout; basal leaves spatulate-oblong; the cauline numerous, auriculate, denticulate; pedicels spreading, pubescent, twice as long as the rough pod. Introd. Armstrong.

2. **L. Draba** L. Perennial, short-pubescent, leaves oblong or oval, the upper clasping; flowers corymbose; pods thickish, tipped with the conspicuous style. Introd., Victoria; Armstrong; Trail.

3. **L. sativum** L. (GARDEN CRESS). Glabrous, about 3 dm. high; the lower leaves bi-pinnatifid, the upper pinnatifid with long segments; pods ovate, winged at the apex, or nearly to base, with a deep notch. A garden escape; Vancouver; Victoria.

4. **L. Menziesii** DC. More or less pubescent-hirsute, 1-3 dm. high, simple or branching above, basal leaves pinnately parted; pubescent or hirsute, the upper linear, entire; stamens 2-4; pods glabrous, slightly notched, style obsolete. A plant near this at Victoria, with the margins of the fruit hispid, should doubtless be referred to *L. lasiocarpum*. Nutt. Victoria.

5. **L. strictum** Ratt. Minutely hispidulous, 1-2 dm. high, simple or branching; leaves linear and entire or pinnatifid; stamens 2-4; sepals colored, petals usually present; pod reticulated, often faintly so, barely winged at apex, the teeth short; style wanting; pedicels $1\frac{1}{2}$ times as long as the pod. (*L. oreganum*, *L. reticulatum*). Victoria; Gulf Islands.

6. **L. apetalum** Willd. Similar to the following: petals wanting; pedicels ascending, the lower little longer than the pods. With the following.

7. **L. medium** Greene. Glabrous or puberulent, 1-3 dm. high, simple or branching above; basal leaves toothed or pinnatifid, the upper oblanceolate or linear, entire or toothed; petals well exceeding the sepals; stamens 2; pedicels spreading or ascending, the lower twice as long as the pods; pods slightly notched; style none. (*L. intermedium* Gray not Rich). Very common everywhere, especially in the D. I.

5. THLASPI (PENNY CRESS)

Glabrous herbs with toothed basal leaves, clasping stem-leaves, and small white or purplish flowers; pods obovate, winged towards the apex, on spreading pedicels.

1. **T. alpestre** L. Perennial; 0.5-3 dm. high; basal leaves elliptical to spatulate, entire or sparingly toothed, petioled, the upper oblong, acuminate; petals white or pale purple, 6 mm. long; pods 6 mm. long, truncate or rounded at the apex, on pedicels, 4-8 mm. long. Alpine; Cascades to Rockies.

2. **T. arvense** L. Annual, 2-4 dm. high, simple or branched above; basal leaves spatulate, wing-petioled, irregularly dentate, the upper oblong, obtuse; petals white, 3 mm. long; pods 10 mm. long, deeply notched, on pedicels 10-15 mm. long. An introd. weed, V. I.; eastward.

6. CAPSELLA (SHEPHERD'S PURSE)

Annuals, with small, white flowers in terminal racemes; pod triangular-obcordate, flattened contrary to the narrow partition, cotyledons incumbent.

1. **C. bursa-pastoris** (L.) Medic. Leaves variable, mainly basal, the cauline sessile arrow-shaped. A common weed.

7. HUTCHINSIA

Small annuals with small white flowers in elongated racemes, and short pods a little compressed contrary to the narrow partition, and somewhat tumid; seeds many, cotyledons incumbent; (Miss Hutchins was an Irish botanist).

1. **H. procumbens** Desv. Stem slender, weak; the plant minutely stellate-pubescent or glabrous; leaves small, spatulate or lanceolate, not clasping, the lower commonly toothed or pinnatifid; sepals obtuse, about equalled by the small petals; pods elliptical, 2-4 mm. long, entire at apex. (*Capsella divaricata* W.) Victoria; Spence's Bridge.

8. NESLIA

Erect herbs with branching pubescence, entire leaves and yellow flowers, pods small, globose, reticulated, 1-celled, 1-seeded. (de Nesle was a French botanist).

1. *N. paniculata* (L.) Desv. (BALL MUSTARD). Rough-hispid, 3-6 dm. high; leaves lanceolate, the upper sagittate-clasping; racemes elongated; pods 2 mm. in diameter. Introd., V. I. eastward. Common.

9. ATHYSANUS

Low, slender annuals with basal leaves and racemes of small flowers, elongated in fruit; petals small or none; pods orbicular, not margined, indehiscent, 1-celled, 1-seeded; cotyledons accumbent. (Gk. *a* without, *thysanos* a fringe; the pod is not margined).

1. *A. pusillus* Greene. Pubescence stellate; many slender stems springing from the base, 1 dm. long; leaves spatulate, entire, or denticulate, cauline leaves very few; pod 2 mm. broad, on short, at length reflexed, pedicels. Dry, sandy places, Victoria.

10. THYSANOCARPUS (LACE-POD)

Much as in *Athysanus*, but the pods are winged. (Gk. *thysanos*, a fringe, *karpos*, fruit).

1. *T. curvipes* Hook. Hirsute below, 1-3 dm. high; radical leaves oblanceolate, pinnatifid or serrately toothed; the upper lanceolate and sagittate; pods 5 mm. broad, winged all around, on short, at length recurving pedicels. Dry slopes, Cedar Hill; Victoria.

11. SUBULARIA (AWLWORT)

Dwarf, stemless, aquatic, perennial, with tufted, awl-shaped leaves; pod ovoid or globose, the valves 1-nerved, seeds several; cotyledons incumbent. (L. *subula*, an awl).

1. *S. aquatica* L. Tufted, leaves nearly terete, growing in shallow water, sending up a few-flowered scape of minute white flowers. Margins of lakes, Nfld. to B.C.; Sproat Lake, V. I.

12. LUNARIA

Pubescent branching annuals, biennials or perennials, with broad leaves; very large, round, flat pods, from which the valves finally fall, leaving the white shining septum. (Whence the name *luna*, the moon).

1. *L. annua* L. (HONESTY). Annual or biennial; flowers purple, large; pod stipitate. A garden escape. Vancouver.

13. ALYSSUM

Perennial or annual herbs, with stellate pubescence; petals yellow or white; entire or retuse; capsule orbicular, margined; valves nerveless, convex, 1-2 seeded. (Gk. *a*, not, and *hyssa*, madness; checking madness).

1. *A. alysoides* L. (YELLOW ALYSSUM). Low, hoary annual; leaves linear-spatulate; petals pale yellow or whitish, little exceeding the persistent sepals. Introd., Vancouver.

14. LOBULARIA (SWEET ALYSSUM)

Perennial herbs, pubescent with hairs attached by the middle; petals white, entire; filaments toothed near the base; pod as in *Alyssum*; seeds 1 in each cell. (Name from the lobed hairs).

1. *L. maritima* Desv. Slightly hoary; leaves linear; petals little exceeding the deciduous sepals; filaments not toothed; flowers honey-scented. Introd., Victoria.

15. LESQUERELLA (BLADDER-POD)

Hoary herbs with stellate pubescence and yellow flowers; pod globose, with a hyaline partition; the valves nerveless; seeds in 2 rows, flat; cotyledons accumbent. (Lesquereux was an American botanist).

1. *L. Douglasii* Wats. Canescent throughout; stems simple, many from a woody caudex, 1-2 dm. high; root-leaves obovate to lanceolate, entire, petioled, the cauline linear-spatulate; pods globose or slightly obovoid, tipped with the slender style. D. I.; Princeton; Penticton.

16. CAMELINA (FALSE FLAX)

Annuals with stellate pubescence; pod obovoid, tipped with the style, acutish, margined; valves 1-nerved; seeds numerous, oblong or round; cotyledons incumbent; flowers yellow. (Gk. *chamai*, low, *linon*, flax).

Seeds 2 mm. long, pods 6-7 mm. broad 1. *C. sativa*.
Seeds 1 mm. long, pods 4-5 mm. broad 2. *C. microcarpa*.

1. *C. sativa* Crantz. Annual, 2-6 dm. high, erect, branching; stem-leaves lanceolate, sagittate-clasping, entire or dentate, pubescence stellate; raceme becoming much elongated; pods on pedicels 1.3-3 cm. long. Introd. Common in interior.

2. *C. microcarpa* Anderz. More slender, 1-6 dm. high; pods smaller, on pedicels 1.5 cm. long, or less. Introd. widely, Vancouver; Kamloops; etc.

17. RADICULA (WATER-CRESS)

Aquatic or marsh plants, glabrous, with seeds in 2 rows in each cell; the convex, nerveless valves forming a terete pod; cotyledons accumbent; flowers white or yellow. *Roripa* Scop. *Nasturtium* R. Br. (name meaning a little radish).

Petals white.

Leaves pinnately divided, plant aquatic 1. *R. nasturtium-aquaticum*.
Leaves undivided or pinnatifid 2. *R. armoracia*.

Petals yellow.

Fruiting pedicels 2-4 mm. long.
Pods curved 3. *R. curvisiliqua*.
Pods straight 4. *R. obtusa*.
Fruiting pedicels 5-8 mm. long.
Pods 3-8 mm. long 5. *R. palustris*.
Pods 8-12 mm. long 6. *R. pacifica*.

1. *R. nasturtium-aquaticum* (L.) B. & R. Perennial, the glabrous stems spreading, and rooting at the nodes; leaflets 3-9, roundish-oblong, entire, the terminal the largest; pods 1-1.5 cm. long, on spreading pedicels as long or longer. Water or wet places, Atlantic to Pacific.

2. *R. Armoracia* (L.) Robinson. (HORSE RADISH). Tall, erect, from thick roots; basal leaves large, simple, serrate-crenate, rugose but glabrous; pods oblong to nearly globose, seldom forming; pedicels 3-5 mm. long. A garden escape.

3. *R. curvisiliqua* Hook. Branching, glabrous or slightly puberulent on the stem, 2-3 dm. high; leaves pinnatifid with toothed lobes, or rarely serrate-toothed; petals small; pods about 1 cm. long, curved upwards, more slender than those of *palustre*. Wet places, Coast and V. I., eastward.

4. *R. obtusa* (Nutt.) Greene. Glabrous, 1 dm. high, branching from the base; leaves lyrate-divided, the lobes broad, obtusely toothed or repand; flowers small; pod nearly straight, from linear-oblong to short-oval. Low ground, Nanaimo; Kamloops; Rockies.

5. *R. palustris* (L.) Mönch. (MARSH CRESS). Erect, branching above, or sometimes from the base, 3-9 dm. high, glabrous or nearly so; leaves pinnately lobed or cleft, the lobes entire or toothed; pods 3-8 mm. long, from cylindrical, to ovoid on spreading pedicels. In wet places V. I., eastward; Alaska. Var. *hispida* (Desr.) Robinson. Hirsute, pods globose or nearly so; eastw.

6. *R. pacifica* Howell. Similar; stout, glabrous, or the auricles of the leaves ciliate; pods acutish at both ends, or obtuse at apex, more or less curved; 8-12 mm. long. Victoria; Fraser Valley; (*T. clavata* Rydb.); Alaska to Wn.; Port Haney.

18. DENTARIA (TOOTHWORT)

Low, glabrous perennials, with stems naked below, from thick short rootstocks, and large pink or purple flowers; pods linear, the valves nerveless, seeds in 1 row, wingless. (*L. dens*, a tooth, in allusion to the rootstocks).

1. *D. tenella* Pursh. Plants 1-3 dm. high, radical leaves merely lobed, the lobes tipped with a mucro; cauline leaves simple or trifoliate, with entire divisions; petals 1 cm. long or less, pink or purplish, pods 1.5-2 cm. long, on pedicels, about as long. Rich woods. Flowering in spring. V. I., and Coast. Common.

2. *D. macrocarpa* Nutt. Plants 1-2 dm. high, radical leaves ternate, the leaflets coarsely toothed; cauline leaves pinnatifid or pinnately divided into 5-7 linear-oblong, mucronate, entire, or toothed segments; petals 10-15 mm. long, purple. (*D. gemmata*). Wet woods, Koksila, V. I.; Burnaby.

19. COCHLEARIA

Low, glabrous, somewhat succulent herbs, with small white flowers; pod subglobose to short oblong, often somewhat obcompressed, the very turgid valves distinctly 1-nerved; seeds 2-several in 2 rows in each cell; cotyledons accumbent. (*L. cochlear*, a spoon, in allusion to the shape of the leaves).

1. *C. anglica* L. Radical and lower cauline leaves petioled, ovate or suborbicular, subentire; pods reticulated, about equaling the pedicel, tipped with the style. Seashore, Metlakatla and northward; Wn.

20. NESODRABA

Stout, acaulescent perennials, with a thick, perpendicular rootstock, crowned with rather ample leaves; peduncles leafy, decumbent; flowers yellow; pod in the following species broad, somewhat turgid, flattened parallel to the partition; seeds in 2 rows, wingless. (*Gk. nesos*, an island, and *Draba*).

1. *N. megalocarpa* Greene. Basal leaves stellately pubescent, 8 cm. long, oblong-spatulate, coarsely few-toothed towards the apex; peduncles 1-1.5 dm. long; pods oblong, about 6 mm. wide, 1.5-2 cm. long, tipped with the distinct style. Triangle Is., V. I.; Queen Charlotte Is.

21. DRABA

Low annuals or perennials with leafy or scapose stems, and white or yellow flowers; sepals short, broad, obtuse; petals obovate; style usually short or wanting; silique ovate to linear-oblong; seeds in 2 rows not winged nor margined. (*Gk. drabe*, biting).

Annuals, style usually none.

Pod pubescent, stem somewhat leafy.

Flowers yellow, or yellow fading white; pods ascending

Flowers white; pods erect

Pod glabrous; stem scapose, leafless, or with 1-2 leaves.

Petals deeply cleft, white

Petals entire or emarginate.

Pubescence, if any, simple, leaves linear-lanceolate

Pubescence stellate, or forked, leaves spatulate to obovate.

Flowers white

Flowers yellow.

Sepals pilose

Sepals glabrous.

Pods 1.5 cm. long

Pods 5-6 mm. long

1. *D. nemorosa*.

2. *D. præalta*.

3. *D. verna*.

4. *D. crassifolia*.

5. *D. Macouniana*.

6. *D. stenoloba*.

7. *D. lutea*.

8. *D. albertina*.

Perennials.

Stem scapose.

Pods suborbicular, pubescent, 3-4 mm. long.

Petals white

9. *D. oligosperma*.

Petals yellow.

10. *D. andina*.

Pod oblong; glabrous or pubescent.

Flowers yellow; style evident

11. *D. alpina*.

Flowers white; style short or wanting.

Scapes pubescent, at least below, pod 1 cm. long.

12. *D. nivalis*.

Scapes glabrous or nearly so.

Pod 8-12 mm. long, becoming twisted

13. *D. lonchocarpa*.

Pod 5-6 mm. long, not twisted

14. *D. Fladnizensis*.

Stems leafy.

Flowers white.

Style 0.5 mm. long, stem leaves lanceolate

15. *D. cana*.

Style 1-1.5 mm. long, stem leaves ovate.

Petals 4-5 mm. long, pods 7 mm. long, or less

16. *D. McCallæ*.

Petals 2 mm. long, pods 1 cm. long, or more

17. *D. columbiana*.

Flowers yellow

18. *D. aurea*.

1. *D. nemorosa* L. Loosely stellate-pubescent, stems leafy below, 0.5-4 dm. high, branching from the base; leaves obovate, ovate to oblong, entire or denticulate; raceme often 2-3 dm. long; petals yellow; sepals villous; pods 1 cm. long or less, pubescent or nearly smooth; pedicels spreading, about twice as long. Coast, eastward and northward. Var. *hebecarpa* Lindl. Petals often white, pedicels 3-4 times as long as the pod. Victoria; Nelson.

2. *D. præalta* Greene. Erect, strict, mostly simple, 2-3.5 dm. high, subcinereous throughout, including the pods, with short stellate hairs; basal leaves oblong-lanceolate, about 1.5 cm. long, entire or toothed; flowers white; fruiting raceme often 1.5 dm. long; pods almost lanceolate, 12 mm. long or more, erect on ascending pedicels nearly as long, acute, rather turgid, not twisted; a channel-like depression marking the line of the midvein. Rockies.

3. *D. verna* L. Scapes more or less stellately-pubescent below, numerous, about 1 dm. high; leaves oblong or oblanceolate, dentate or entire, acutish, stellately-pubescent; petals white; pods 6-8 mm. long, much shorter than the pedicels. Widely distributed in N. A.; Victoria.

4. *D. crassifolia* Grah. Glabrous throughout, or the leaves hirsute; scape naked, or with a single leaf 1 dm. high; leaves linear-oblanceolate to spatulate, in a basal tuft, entire or serrulate; flowers white or yellow, the petals little exceeding the sepals; pods 5-10 mm. long, on pedicels about as long. Alpine; Rockies.

5. *D. Macouniana* Rydb. Stems ascending or decumbent, less than 1 dm. high; glabrous and shining; basal leaves, obovate, 5-10 mm. long, finely stellate, rather thick; stem leaf usually 1; pedicels in fruit spreading 6-8 mm. long; petals white, less than 3 mm. long; pod oblong-linear, erect, about 1 cm. long. Rockies.

6. *D. stenoloba* Ledeb. Glabrous and shining above, stellate-pubescent below, 1-3 dm. high; leaves mostly basal, obovate to oblanceolate; fruiting raceme long; petals yellow, larger than the sepals; pod 10-15 mm. long, on pedicels 1-3 times as long. (*D. nitida* Greene). Rockies; Cascades; Alaska.

7. *D. lutea* Gilib. Similar; stems sometimes nearly leafless; petals yellow to whitish; pedicels less than twice as long as the glabrous pod. (*D. nemorosa leiocarpa* Lindl.) Kamloops; Okanagan Valley; Victoria.

8. *D. albertina* Greene. Apparently annual or biennial, the tuft of radical leaves single; flowering stems many, about 1 dm. high; loosely racemose from near the base, naked, or with a single oblong leaf; basal leaves less than 2.5 cm. long, spatulate-linear or oblong, entire; sparingly beset with simple or forked hairs; base of stems with scattered, simple hairs; inflorescence glabrous; petals pale yellow; pods elliptical-oblong, seldom 6 mm. long on ascending pedicels of equal length, or longer; style none. Crow's Nest Pass.

9. *D. oligosperma* Hook. Tufted, 4-8 cm. high, leaves linear, obtuse, keeled by the prominent mid-nerve, stellate-pubescent; scapes slightly

pubescent; petals white, about twice as long as the puberulent sepals; pods finely puberulent or glabrate, nearly orbicular, with an acute apex, on pedicels 1-2 times as long. (*D. alpina* var. *oligosperma*). Alpine, Rockies; Alaska.

10. *D. Andina* (Nutt.) A. Nels. Densely tufted, the numerous branches of the caudex densely clothed with the old leaves; leaves oblong-spatulate, more or less stellately-pubescent; scapes glabrous 4-10 cm. high, fruiting nearly to the base; petals yellow, often fading white; silique ovate-oval, 3-4 mm. long, clothed with short, stiff, simple hairs and tipped with a style 1 mm. long. Crow's Nest Pass; Banff.

11. *D. alpina* L. More or less tufted; leaves oblong or oblanceolate, 6-18 mm. long, more or less stellately-pubescent, scape slender, 2-15 cm. high, hairy or nearly smooth, few-flowered; sepals smooth or nearly so; petals 3 mm. long, pale yellow; pods 6-8 mm. long, oblong, acute at both ends, glabrous or stellately-pubescent; pedicels about as long. Rockies; Alaska. Var. *glacialis* Dickie. Leaves narrower, pod pubescent, short-ovate-lanceolate. Mt. Garibaldi to Rockies.

12. *D. nivalis* Lilj. Low, tufted, stems naked, or with 1 leaf, 3-12 cm. high, somewhat pubescent, leaves tufted, oblanceolate or spatulate, 4-14 mm. long, entire, sometimes ciliate at base, stellately-pubescent; flowers white or pale yellow, on pedicels 2-6 mm. long; pods oblong, glabrous or nearly so; style short. Alpine; Rockies; Mt. Cheam; Alaska.

13. *D. lonchocarpa* Rydb. Stems naked, glabrous, less than 1 dm. high; basal leaves very dense, in clusters, spatulate, obovate, obtuse, less than 5 mm. long, sometimes ciliate at base; pods smooth, 8-12 mm. long, sometimes twisted, on pedicels 3-10 mm. long. Alpine; crevices of rocks, Mt. Cheam; Rockies.

14. *D. Fladnizensis* Wulf. Low, tufted; leaves oblanceolate, entire, acute, stellate-canescens, and ciliate; scapes 2-6 cm. high, glabrous; flowers whitish, on short pedicels 2-4 mm. long; pods oblong, glabrous, 4-6 mm. long; style nearly obsolete. (*D. androsacea* Wahl.) Arctic, southward on Rockies.

15. *D. cana* Rydb. Erect, usually branching, grayish stellate throughout, 1-2 dm. high, basal leaves oblanceolate, 1-1.5 cm. long, entire or few-toothed; stem leaves lanceolate, about 1 cm. long; petals white, 3-4 mm. long; pod linear-oblong, 6-8 mm. long, pubescent, or nearly glabrous, on hairy ascending pedicels, 3-10 mm. long. (*D. incana*). Rockies; Field; Crow's Nest Pass.

16. *D. McCallæ* Rydb. Sparingly stellate, green, stems several, simple, about 3 dm. high; basal leaves spatulate, 10-18 mm. long, entire or nearly so; stem leaves ovate; raceme elongated; pedicels in fruit 1 cm. long, erect; pod ovate, densely but finely pubescent, much shorter than the pedicels. Rockies eastward; perhaps B.C.

17. *D. columbiana* Rydb. Sparingly stellate and ciliate on the margins of the leaves; stems slender, about 2 dm. high, simple; basal leaves oblanceolate, 10-15 mm. long, denticulate or entire; stem leaves ovate; raceme elongated; pedicels slender, ascending, 5-7 mm. long in fruit; pods finely pubescent. Revelstoke.

18. *D. aurea* Vahl. Erect, leafy, 1-3 dm. high, pubescent with stellate and simple hairs; leaves oblanceolate or lanceolate, entire or denticulate, 1.5-2 cm. long; petals yellow, entire or emarginate; pod lance-oblong, usually pubescent, often twisted, 8-12 mm. long on pedicels 4-8 mm. long. Valleys and mt. slopes, Rockies; Peace River.

22. ARABIS (ROCK CRESS)

Herbs with white or purple flowers, and mostly entire or denticulate, stellately-pubescent leaves; pod linear, flat, more or less 1-nerved or longitudinally veiny; seeds in 1 or 2 rows, winged or wingless; cotyledons accumbent. (Name from Arabia).

Pods reflexed, or drooping.	
Plants stout; seeds winged.	
Stem leaves auriculate	1. <i>A. Holboëllii</i> .
Stem leaves not auriculate	3. <i>A. canescens</i> .
Plants slender, seeds wingless	4. <i>A. humifusa</i> .
Pods erect or spreading.	
Pods strongly curved	2. <i>A. columbiana</i> .
Pods straight or nearly so.	
Basal leaves, or some of them, lyrate, seeds wingless	5. <i>A. lyrata</i> .
Basal leaves entire or dentate.	
Stems glabrous except at the very base	6. <i>A. glabra</i> .
Stems glabrous throughout.	
Sepals pubescent	7. <i>A. Lemmonii</i> .
Sepals glabrous.	
Tall, hairs 2-forked	8. <i>A. Drummondii</i> .
Low, pubescence stellate	9. <i>A. Lyallii</i> .
Stems more or less hirsute except upwards.	
Pedicels ascending or erect.	
Pods 4-6 cm. long, stem-leaves auricled	10. <i>A. hirsuta</i> .
Pods 1-2 cm. long, stem-leaves not auricled	12. <i>A. Nuttallii</i> .
Pedicels spreading, pods almost 2-5 cm. long	11. <i>A. Hookeri</i> .

1. *A. Holboëllii* Hornem. Biennial or perennial, 3-6 dm. high, both simply and stellately-pubescent, or glabrate upwards; stems solitary or few, branching above or simple; the basal leaves usually entire, narrowly oblanceolate; the cauline narrowly lanceolate, auriculate; flowers 6-7 mm. long; calyx 3-3.5 mm. long, stellate, conspicuously scarious-margined at summit, and often colored; petals mostly purplish, twice as long as the sepals; pods 4-6 cm. long, glabrous; on pedicels 6 mm. long; seeds in 2 rows, winged. Dry soil, Victoria; and D. I.; Kamloops; Summerland; Alaska.

2. *A. columbiana* Macoun. Similar, pedicels spreading or slightly ascending; pod spreading, strongly curved or sickle-shaped. Yale; North Thompson.

3. *A. canescens* T. & G. Similar, more strongly stellate-pubescent throughout, 2-4 dm. high; stems numerous, the basal leaves entire linear-lanceolate, the cauline linear, slightly clasping, not auriculate; flowers 5-6 mm. long, petals whitish; calyx 2-3 mm. long, stellate, slightly scarious-margined at apex, not colored; pods mostly glabrous, 3-5 cm. long, on pedicels 2-6 mm. long. Plains and lower mt. slopes D. I.; Yale; Nicola.

4. *A. humifusa* (Vahl.) Wats. Perennial, from a slender root, pubescent below, or glabrous; stems ascending 1-1.5 dm. high; basal leaves spatulate to oblong, nearly entire; petals white or purplish, twice as long as the sepals; pods 15-25 mm. long. at length drooping; seeds oblong, wingless. Rockies; Emerald Lake.

5. *A. lyrata* L. var. *occidentalis* Wats. Glabrous, or the usually lyrate, basal leaves somewhat hirsute, especially on the petioles; stem 1-3 dm. high, simple, sometimes glabrous, slender; petals white, twice as long as the yellowish, sometimes purple-tipped sepals; pods 3 cm. long, very narrow, faintly nerved; style 0.5 mm. long; seeds orbicular in 1 row. Alaska southward in the Rockies, and Selkirks; Cowichan Lake.

6. *A. glabra* (L.) Bernh. (TOWER MUSTARD). Tall, 6-9 dm. high, glaucous and glabrous except at the base; stem leaves clasping, entire, ovate-lanceolate, the basal dentate, sometimes lyrate; flowers whitish-yellow, small; pods 6-8 cm. long; seeds wingless. Dry open ground; common.

7. *A. Lemmonii* Wats. Perennial 1-2 dm. high, stems several, basal leaves hoary, with stellate-pubescence, oblanceolate, entire, or nearly so, the petioles sometimes ciliate; the cauline auriculate, mostly glabrous; petals

rose-colored; pods spreading or ascending, 3-4 cm. long, seeds in 1 row, narrowly winged. Bow River Pass.

8. *A. Drummondii* Gray. Glabrous except the basal leaves, 1-6 dm. high, the pubescence of 2-forked hairs attached by the middle; stems 1-several, from a woody caudex; stem leaves sagittate-clasping; basal leaves oblanceolate, entire, tapering to a petiole, often glabrate or glabrous above; petals white or purple, fully twice as long as the sepals; pods 3-8 cm. long, seeds usually in 2 rows, broadly winged. (*A. albertina* Greene). Mt. Cheam; Rockies.

9. *A. Lyallii* Wats. Similar in general appearance; stems several, from a woody caudex, 1-3 dm. high, glabrous above, the basal leaves stellate; stem leaves auriculate-clasping; petals white or purplish; pods 3-4 cm. long; seeds in 1 or 2 rows, narrowly winged. Mt. Cheam; Rockies.

10. *A. hirsuta* (L.) Scop. Rough, hairy, 3-9 dm. high, simple hairs and sparingly forked intermingled; basal leaves rosulate, 2-5 cm. long, obovate, tapering to the petiole; cauline oblong to lanceolate, somewhat clasping, all entire or denticulate, sometimes glabrous, base auriculate; petals purple or white, 6-7 mm. long, more than twice as long as the calyx; pedicels erect; pods 4-6 cm. long; seeds wingless; style 0.5-2 mm. long. Coast to Rockies.

11. *A. Hookeri* Lge. Biennial or perennial; stems many, 1.5-2.5 dm. long; pubescence forked, dense; basal leaves rosulate, lanceolate, sinuate-dentate; the cauline sagittate-clasping, subentire; raceme finally lax, the pedicels spreading, about 12 mm. long; petals white, obovate; silique erect-ascending, almost 2.5 cm. long; seeds dark-brown, small, oval, in 2 rows. Arctic regions; Cowichan Lake, V. I. A form from Kamloops with entire leaves looks like a distinct species, but the specimen is too young to judge.

12. *A. Nuttallii* Rob. More or less hirsute, the pubescence simple or forked, glabrous above; 2-3 dm. high; basal leaves spatulate-oblanceolate, 2-3 cm. long; the cauline mostly oblong, not auricled; petals white or purple, 5 mm. long; pod short, about 2 cm. long, on ascending pedicels half as long to nearly as long; seeds wingless. Rockies; Vernon.

23. CARDAMINE (BITTER CRESS)

Nearly glabrous perennials or annuals, with mostly small, white flowers and linear flattened pods, the nerveless valves usually opening elastically from the base; seeds wingless in a single row in each cell; cotyledons accumbent, equal; stems usually leafy. (A Greek name referring to cardiacal qualities).

Stamens 4	8. <i>C. hirsuta</i> .
Stamens 6.	
Leaves entire or sinuate.	
Alpine, dwarf (2-4 cm. high); leaves ovate	1. <i>C. bellidifolia</i> .
Tall, (1-4 dm. high); leaves cordate	2. <i>C. Lyallii</i>
At least some of the leaves pinnate.	
Petals 1 cm. long, orbicular	3. <i>C. pratensis</i> .
Petals less than 1 cm. long, obovate or unguiculate.	
Flowers sub-corymbose or sub-umbellate; low; leaf-segments 5-7	6. <i>C. kamtschatica</i> .
Flowers racemose.	
Tall, leaf-segments usually 3	4. <i>C. angulata</i> .
Some of the basal leaves usually not pinnate, their blades or terminal segments cordate or sub-cordate	7. <i>C. Breweri</i> .
Leaves all pinnate, their segments not cordate nor sub-cordate.	
Annual.	
Middle and upper leaf-segments mostly oblong; seeds 20-30	10. <i>C. pennsylvanica</i> .
Leaf-segments mostly rounded, seeds fewer than 20	9. <i>C. oligosperma</i> .
Perennial	5. <i>C. occidentalis</i> .

1. *C. bellidifolia* L. (ALPINE CRESS). Tufted, glabrous; radical leaves long-petioled, the cauline shorter-petioled, the mostly entire blades (8-12 mm. long) narrowing abruptly in the petiole; the pods erect, on pedicels 4-6 mm. long. Rockies; Alaska.

2. *C. Lyallii* Wat. Glabrous, from a short rootstock; leaves reniform to cordate, 2 cm. or more long, petioled, with sinuate margins; pods on spreading pedicels 2 cm. long. Along brooks, Cascade Mts.

3. *C. pratensis* L. (CUCKOO FLOWER). Perennial, from a short rootstock; leaflets numerous, rounded and stalked below, oblong or linear above, entire or slightly toothed; petals white or rose, broad; pod 2-3 cm. long, 2 mfh. broad. Alaska S. E. to Mass.

4. *C. angulata* Hook. Glabrous, 3-6 dm. high; leaves usually 3-, sometimes 5-divided, leaf-divisions of basal leaves sub-rotund or cordate, of stem-leaves ovate or lanceolate, the terminal mostly largest, acuminate, angularly or incisely lobed, the angles or lobes toothed or somewhat obtuse; flowers rather large in terminal and axillary corymbs; pedicels 4-8 mm. long; petals, pale rose or white, more than twice as long as the sepals. Alaska and Queen Charlotte Is. to Wn.

5. *C. occidentalis* S. Wats. Nearly glabrous, slender, 1-2.5 dm. high, the lower leaves with 5-11 segments, which are round or obovate, mostly entire or the not much larger terminal somewhat bluntly 3-lobed; petals 4 or 5 mm. long, twice as long as the brown-purple, scarious-margined sepals; pods 2.5 cm. long, on pedicels nearly 1 cm. long, seeds fewer than 20 (?). Mts., Alaska to Wn. Roche de Boule; Chilcoten (W. Newcombe).

6. *C. kamschatica* Schultz. Glabrous, flowering the first year but lasting longer; 1-3 dm. high; leaf segments 5-7, those of the upper leaves oblong-obovate or lanceolate, of the lower roundish, the terminal slightly or strongly 3-lobed; flowers few, more or less umbellate, petals 4-5 mm. long, twice as long as the sepals; pods 1.5-3 cm. long, on short pedicels. (*C. umbellata*. Greene). Victoria; Mt. Cheam; Roger's Pass; Rockies; Alaska.

7. *C. Breweri* Wats. Glabrous or slightly hirsute at base of stem, 1.5-4 dm. high; radical leaves simple or with 2-6 divisions, the terminal division much the largest, all sinuate-toothed or entire; the cauline more or less sharply 3-lobed; petals 3-5 mm. long; pods 2-2.5 cm. long, ascending, on ascending pedicels 4-10 mm. long. Common in wet places, Coast; northw. to Alaska. An allied form from V. I. with the upper cauline leaves distinctly and sharply 3-lobed, apparently with none of the basal simple, and with larger petals may be *C. intermedia* Holm.

8. *C. hirsuta* L. Annual, stems 1-2 dm. high, sparingly leafy, leaflets of basal leaves rounded, those of the upper leaves narrow, all more or less hirsute on the upper face, not petiolulate; pods 1 mm. broad, sub-erect, generally with more than 20 seeds. Introd. Victoria.

9. *C. oligosperma* Nutt. Annual, slender, 1-3.5 dm. high; leaflets petiolulate, in 4 or 5 pairs, small, usually 3-lobed, pubescent above or glabrous, the terminal not much larger than the lateral, roundish below, obovate above; petals 3 mm. long; pods 5-8 towards the ends of the branches, 1.5 mm. wide, seeds fewer than 20. Common at the Coast, woods and roadsides.

10. *C. pennsylvanica* Muhl. Stem short and leafy, or slender, usually branched, 2.5-6 dm. high; leaflets 7-11, nearly or quite glabrous, the terminal obovate, the lateral oblong, slightly decurrent along the rachis, or obscurely petiolulate; pods erect, or ascending, 1 mm. wide, 2-3 cm. long, on somewhat divergent pedicels 5-10 mm. long; seeds 20-30. Common. Native and introd.

24. THELYPODIUM

Tall, coarse biennials, with dense elongated racemes; petals linear-spatulate, long, white (in ours); anthers sagittate at base; pods long, somewhat compressed, with a strong midrib, stipitate. (Gk. *thelys*, female, *pous*, a foot, or stalk, in allusion to the stalked pod).

1. *T. laciniatum* Endl. Glabrous, about 9 dm. high; leaves petioled, coarsely toothed or pinnatifid, 1 dm. long; pods 4-5 cm. long on short, stout pedicels, shorter than the stipe. Summerland; apparently introduced.

25. BRAYA

Low, with several stems from a perennial root; petals purplish, clawed; anthers ovate; style short; stigma indistinctly 2-lobed; pod linear, flattened, the valves with 1 more or less distinct nerve, and several finer ones; more or less torulose; seeds in 1 row. (Named for Count de Bray of Rouen).

1. *B. humilis* Rob. Pubescent and usually purplish throughout, 1-2 dm. high; leaves mostly basal, narrowly oblanceolate, usually entire; the petals twice as long as the obtuse purplish sepals; pods pubescent, curving, ascending, about 1.5 cm. long, on many short pedicels; seeds oblong. Golden; Field.; and northw.

26. CAKILE

Glabrous, fleshy, seaside annuals with purplish flowers; pod teretish, short, 2-jointed, the joints indehiscent, 1-celled, 1-seeded, the lower joint often not developing. (An Arabic name).

1. *C. edulenta* Hook. (SEA ROCKET). Diffuse, leaves oblanceolate, sinuate and toothed; petals twice as long as the sepals. Ucluelet, Victoria.

27. RAPHANUS (RADISH)

Annual or biennial, with pinnatifid, lyrate, hirsute leaves and indehiscent pods tapering in a long beak, and spongy between the seeds; flowers large, with veiny petals. (Gk. *rha*, quickly, *phainesthai*, to appear, alluding to the rapid germination).

1. *R. raphanistrum* L. (JOINTED CHARLOCK). Petals yellow, veiny, turning white or purplish; pod longitudinally grooved, 2-10-seeded, long, slender, torulose. Introd. weed, V. I., Agassiz.

2. *R. sativus* L. (RADISH). Petals pale purple or pink; pods smooth, 2-3-seeded, stout, not torulose. Persistent about gardens and fields.

28. BRASSICA (MUSTARD, TURNIP)

Annuals or biennials with yellow flowers and entire or pinnatifid (mostly lyrate) leaves; pod terete or 4-sided, with a stout, often 1-seeded, beak, valves 1-5 nerved; seeds in 1 row, globose. An introduced genus. The following species are found in waste places or along railways. (Latin name for Cabbage).

Upper leaves cordate, clasping 1. *B. campestris*.
Leaves not cordate.

Beak flat, $\frac{1}{2}$ - $\frac{1}{3}$ the length of the pod; usually 1-seeded.

Pods bristly, beak one-half its length 2. *B. alba*.
Pods knotty; beak one-third of its length 3. *B. arvensis*.

Beak conical.

Pods and pedicels appressed, pods hardly 2 cm. long 4. *B. nigra*.
Pods and pedicels ascending, pods 2.5-3 cm. long 5. *B. juncea*.

1. *B. campestris* L. Glaucous, hispid, with scattered hairs; leaves lyrate and petiolate below; flowers 8-10 mm. broad, pale yellow; pods 3-5 cm. long, with a beak 8-10 mm. long. *B. Rapa*. (TURNIP) Glabrous; flower smaller.

2. *B. alba* (L) Boiss. (WHITE M.) Hispid-pubescent, lower leaves lyrate, the upper lanceolate, dentate or pinnatifid; pods, with strongly flattened beak, ascending on spreading, stout pedicels 1 cm. long; seeds pale.

3. *B. arvensis* (L) (CHARLOCK) Ktze. Hispid-pubescent, or smooth above; leaves lyrate, the upper sessile, or pinnatifid, or merely toothed; pods 3-4 cm. long, glabrous, ascending, on short, thick pedicels, 6 mm. long; beak often 1-seeded.

4. *B. nigra* (L) Koch. (BLACK M.) Hirsute, with scattered hairs; the upper leaves petioled, the lower with a very large terminal lobe, and a few smaller ones; seeds dark brown.

5. *B. juncea* (L) Cosson. Nearly glabrous, often glaucous, upper leaves entire, attenuate at base, the lower lyrate, the basal with a large terminal lobe; pods on slender ascending pedicels, at length 1 cm. long; beak empty, about one third the length of the body of the pod.

29. SISYMBRIUM (HEDGE MUSTARD)

Mostly annuals; pubescence simple or stellate; leaves runcinate-pinnatifid or dissected; flowers yellow, whitish or white; pods terete or 4 sided, the valves 1-3 nerved, seeds oblong in 1 or 2 rows.

Leaves entire, or nearly so.

- Annual, leaves mostly basal, pubescent at base, leaves oval . . . 1. *S. Thalianum*.
 Perennial, leafy, glabrous throughout, leaves linear . . . 2. *S. linifolium*.

Leaves pinnate or pinnatifid.

Pubescence simple or none.

- Pods less than 1 cm. long . . . 3. *S. officinale*.
 Pods 5 cm. long, or more . . . 4. *S. altissimum*.

Pubescence stellate or of forked hairs.

- Siliques and pedicels erect, each less than 1 cm. long . . . 7a. *S. incisum* var. *Hartwegianum*.

Siliques and pedicels spreading, siliques mostly 1 cm. or more long.

- Seeds in 2 rows in each cell . . . 5. *S. canescens*.

Seeds in 1 row in each cell.

- Leaves tripinnate, plants canescent, pods 2 cm. long . . . 6. *S. Sophia*.

Leaves pinnate or bipinnate, plants not canescent, pods less than 2 cm. long.

- Pedicels shorter than the pods . . . 7. *S. incisum*.
 Pedicels longer than the pods . . . 7b. *S. incisum* var. *filipes*.

1. ***S. Thalianum* (L.) Gay.** Slender, branching, 1-3 dm. high; leaves mainly in a basal rosette, obovate, entire, or slightly toothed; stem hairy at the base; pods linear, 1-2 cm. long, somewhat 4-sided. Sparingly introd. Coast.

2. ***S. linifolium* Nutt.** Perennial, glabrous and often glaucous; slender, 3-6 dm. high; simple or branching; leaves linear, entire, or the lower sometimes with linear lobes; petals 7-9 mm. long, calyx often yellow; pods slender 3-5 cm. long, ascending on ascending pedicels 5-9 mm. long. East of the Cascades.

3. ***S. officinale* (L.) Scop.** Var. ***leiocarpum* D.C.** Tall and coarse, leaves runcinate, the basal lobes often long; stem glabrous or with sparing retrorse pubescence; flowers yellow; pods nearly sessile, glabrous, appressed, on elongated racemes (2-5 dm. long). A common weed. The species, ***S. officinale* L.**, with pubescent pods may also occur.

4. ***S. altissimum* L. (TUMBLE MUSTARD).** Tall and coarse, hirsute leaves deeply pinnatifid with narrow segments; flowers pale-yellow; pods about 6 cm. long, on pedicels nearly 1 cm. long. Very common, D. I.; introd. everywhere.

5. ***S. canescens* Nutt.** Canescent, 2-6 dm. high, leaves bipinnatifid; petals equaling the sepals; pods in long racemes, linear, cylindrical, shorter than the spreading, slender pedicels. Common, D. I.

6. ***S. Sophia* L.** Similar, hoary, with decompound leaves; pods about 2 cm. long, slender, ascending. Introd.

7. ***S. incisum* Engelm.** Similar; green, glabrous except at the base, or densely pubescent and more or less glandular; leaf segments often linear; pods 7-15 mm. long, slightly curved ascending, on spreading pedicels $\frac{2}{3}$ as long; seeds mostly in 1 row. D. I.; Fernie.

7a. Var. ***Hartwegianum* (Fourn.) Wats.** Siliques 5-7 mm. long, crowded, erect or suberect, on nearly erect pedicels of about the same length. D. I.

7b. Var. ***filipes* Gray.** Pedicels filiform, several times longer than the pods. D. I.

30. HESPERUS (DAME'S VIOLET)

Tall, erect perennials, with large purple or whitish flowers, mostly entire leaves and long cylindrical pods; the seeds in 1 row in each cell; stigma lobed. (Gk. *hespera*, evening, when the flowers are fragrant).

1. *H. matronalis* L. Pubescent; leaves lanceolate-ovate, serrate, acuminate; pods 5-8 cm. long on ascending stout, pedicels 7 mm. long; petals 1 cm. long. A garden escape, Victoria; New Westminster.

31. BARBAREA (WINTER CRESS)

Biennial or perennial; leaves lyrate-pinnatifid; flowers yellow, silique linear, the valves somewhat keeled by a strong midnerve; seeds in 1 row in each cell. (The herb of St. Barbara).

1. *B. vulgaris* R. Br. Glabrous; the basal leaves with a large terminal lobe, and 1-4 small lateral lobes or divisions; flowers bright yellow in a long raceme, petals about twice as long as the sepals; pods ascending, 2-3 cm. long, on ascending or spreading pedicels. Introd. and native. Common.

2. *B. americana* Rydb. Similar, petals smaller, 2-4 mm. long; pedicels shorter, 2-3 mm. long; styles shorter, scarcely 0.5 mm. long. Native; Coast to N. W. Territory.

3. *B. stricta* Anderz. Leaves, etc., much as in *B. vulgaris*; flowers paler; at flowering corymbosely arranged at the summit; pods erect, appressed. Alaska to Quebec; and southward to Wash.

32. ERYSIMUM (TREACLE MUSTARD)

Erect herbs, more or less pubescent with 2-branched hairs; flowers yellow; leaves entire or toothed; pods long, 4-angled, the valves with a strong midrib; cotyledons incumbent. (Gk. *eruein*, to draw blisters).

Petals 5-10 mm. long.

Pedicels slender, half as long as the pods 1. *E. cheiranthoides*.

Pedicels stout, not one-sixth as long as the pods 2. *E. parviflorum*.

Petals 12-20 mm. long.

Seeds 4-angled 3. *E. asperum*.

Seeds lenticular, margined 4. *E. elatum*.

1. *E. cheiranthoides* L. (WORMSEED MUSTARD). Plant green; stem slender, 3-6 dm. high, simple or sparingly branching above, with more or less appressed pubescence; leaves lanceolate or oblanceolate, rather distant, 2.5-9 cm. in length, entire or nearly so; petals 5-6 mm. long; pods slender, 2 cm. long or less, on ascending-spreading pedicels. Usually in moist soil, Armstrong, Yale, Cameron Lake, V. I., Alaska.

2. *E. parviflorum* Nutt. Plant scabro-canescens, stem 2-6 dm. high, rough-pubescent, simple or branching, leaves crowded, linear-oblanceolate, mostly entire; petals 6-10 mm. long; pods stout, 2.5-5 cm. long, ascending or nearly erect; pedicels 4-6 mm. long. Gravelly soil, Spence's Bridge; Kamloops.

3. *E. asperum* (Nutt.) D.C. (WESTERN WALL-FLOWER). Usually simple, greenish-canescens, with appressed pubescence, 2-6 dm. high; leaves oblanceolate or linear, attenuate below to a long petiole, entire or toothed; flowers in a short raceme, petals yellow or orange, often changing brownish, 15-20 mm. long; pods 2.5-8 cm. long, nearly erect on spreading, short pedicels; style 2-3 mm. long. East of the Cascades.

4. *E. elatum* Nutt. Scabrous and usually canescens, 3-10 dm. high, usually simple, leaves lanceolate, entire or repand dentate, or the lowest pinnatifid; petals light yellow; pods 5-10 cm. long, erect or spreading, on spreading pedicels 4-12 mm. long; style 1-2 mm. long. Cameron Lake, V. I.; Pend Oreille Valley.

DROSERACEÆ (SUNDEW FAMILY)

Glandular bog-plants with regular, hypogynous flowers; the parts of the flower mostly in 5's; capsule 1-celled, styles 3-5, placentæ parietal; anthers versatile; leaves circinate in the bud.

1. DROSERA (SUNDEW)

Low, scapose, reddish plants; the second raceme simple or forked; stamens 5, styles 3 or 5, often deeply parted so as to appear 6 or 10, capsule 3-valved; flowers opening only in sunshine; the glands of the leaves exude a sticky fluid to attract insects, which in part supply the plant with nourishment. (Greek *droseros*, dewy).

1. **D. rotundifolia** L. (ROUND-LEAVED S.) Leaves orbicular, narrowing abruptly into spreading hairy petioles; scape 1 dm. or so high, 1-20-flowered; flowers 5-7 mm. broad; seeds slender, spindle-shaped. Wet moss in bogs. Common, Alaska to Cal.

2. **D. anglica** Huds. (LONG-LEAVED S.) Leaves spatulate, tapering to somewhat erect, smooth or sparsely hairy petioles; scapes 1-8-flowered, seeds spindle-shaped. (*D. longifolia*). Horne Lake, V. I.; Lulu Island; Selkirks; Alaska.

CAPPARIDACEÆ (CAPER FAMILY)

Herbs with 4 petals, 6 or more equal stamens and 4-8 sepals; pod 1-celled with 2 parietal placentæ.

1. CLEOME

Annuals with palmately divided leaves and bracteate racemes; stamens 6, sepals 4; petals entire, with claws; ovary linear, many-seeded, long-stipitate.

1. **C. serrulata** Pursh. (STINKING CLOVER). Nearly glabrous, except on the pedicels, 2-5 dm. high; leaves 3-foliate, the leaflets lanceolate, mostly entire; a beautiful plant with rose-colored flowers on pedicels 2 cm. long. D. I.; Peachland; Cranbrook.

RESEDACEÆ (MIGNONETTE FAMILY)

Herbs with small, unsymmetrical, 4-7-merous flowers, the numerous stamens borne on a fleshy 1-sided disk; calyx not closed in the bud; capsules 3-6 horned, 1-celled, with 3-6 parietal placentæ, opening before the seeds are mature.

1. RESEDA (MIGNONETTE)

Flowers small, in terminal spikes, petals 4-7 cleft, unequal; stamens 12-40 on one side of the flower. (*L. resedare*, to calm).

1. **R. alba** L. Erect, about 3 dm. high; leaves pinnately parted; flowers greenish-white; petals 5-6; stamens 12-15. Occasionally found in waste places. (*R. odorata* is the garden M.)

CRASSULACEÆ (ORPINE FAMILY)

Herbs, usually succulent, with symmetrical flowers, petals, sepals and carpels the same in number, stamens as many or twice as many, carpels distinct or nearly so, a small scale at the base of each; fruit dry, dehiscent follicles.

Flowers axillary; calyx lobes, petals, stamens and carpels 3 or 4 . . . 1. Tillæa.
Flowers cymose; calyx lobes, petals and carpels 4 or 5, stamens 8-10. . . 2. Sedum.

1. TILLÆA

Low, somewhat tufted, annuals, with opposite entire leaves, and axillary flowers; calyx-lobes, petals, stamens and carpels 3-4; pods 2-many-seeded. (Tilli was an early Italian botanist).

1. *T. aquatica* L. Low, 2-8 cm. high; leaves linear, about 5 mm. long, obtuse lobes, calyx $\frac{1}{3}$ the length of the greenish corolla; pods 8-10 seeded. Mud, Fraser River, New Westminster; Wn.; Atlantic Coast.

2. SEDUM (STONECROP)

Perennial with, thick fleshy, mostly entire, leaves; calyx-lobes and petals 4-5; stamens 8-10, follicles 4-5, many seeded; inflorescence cymose. (L. sedere, to sit, in allusion to habit).

Petals united at base 1. *S. oreganum*.
Petals distinct.

Flowers perfect, yellow, petals acute.

Leaves broadest at, or towards, apex.

Leaves glaucous, 1-2 cm. long 2. *S. spathulifolium*.

Leaves not glaucous, less than 1 cm. long 3. *S. divergens*.

Leaves oblong or lanceolate.

Leaves terete. 4. *S. stenopetalum*.

Leaves flattened 5. *S. Douglasii*.

Flowers dioecious, purplish 6. *S. integrifolium*.

Flowers dioecious, yellow, petals obtuse 7. *S. rosea*.

1. *S. oreganum* Nutt. Branching from the base, leafy into the inflorescence; leaves green and glabrous, not mealy, broadly cuneate, apex truncate, or rounded; the lower 1.5 cm. long or less; inflorescence 3-4 cm. broad, leafy bracted; pedicels very short, calyx ovate-lanceolate, one-quarter as long as the linear-lanceolate petals, which quite exceed the stamens and carpels, are united at base, and fade pink. Rocky bluffs, Cameron Lake; Alaska. (*Gormania oreganum*) *S. obtusatum* Gray. Reported from Goldstream, near Victoria, differs from this in the somewhat elongated cyme, sometimes longer than broad; in the longer pedicels, 3-6 mm. long, and in the lanceolate petals but little longer than the stamens.

2. *S. spathulifolium* Hook. Branching from the ascending base, 1-1.5 dm. high, usually mealy; leaves obovate; inflorescence 4-5 cm. broad, pedicels 3 mm. long, petals 8-10 mm. long, lanceolate twice as long as the lanceolate sepals, and scarcely longer than the stamens and styles; carpels long-tipped, hardly divergent. Rocky bluffs V. I. and west of the Cascades; Columbia Valley.

3. *S. divergens* Wats. Stems ascending, 0.5-1.5 dm. high; leaves obovate, obtuse, 5-8 mm. long, opposite at least on the sterile stems; inflorescence 3-cm. broad, the branches short; sepals ovate, often obtuse, one-third as long as the lanceolate petals, which are 5-7 mm. long and hardly equal the stamens; carpels widely divergent above. Cascade Mts., Mt. Cheam; Lillooet.

4. *S. stenopetalum* Pursh. Erect, 0.5-1.4 dm. high; leaves crowded, linear-oblong, terete, 7-14 mm. long, hardly glaucous, green, or often reddish; cyme dense; petals broadly lanceolate, twice as long as the lanceolate sepals and slightly exceeding the stamens; carpels slenderly tipped, hardly divergent. Rocky places, V. I., Lytton; Mt. Cheam; subalpine slopes of Rockies.

5. *S. Douglasii* Hook. Erect, simple or branching from near the base, 1-2 dm. high, often with short, densely leafy branches along the stem; leaves flattish, lanceolate, acuminate, 1-2.5 cm. long, becoming scarious or brown; cyme broad or sometimes reduced to a single flower; sepals ovate or about $\frac{1}{4}$ as long as the petals; petals mostly less than 1 cm. long; carpels very divergent. Rocky hillsides; Sicamous; Arrowhead; Crow's Nest Pass.

6. *S. integrifolium* (Raf.) Nels. Rootstock fleshy, stem 1-2 cm. high, leaves obovate to oblong-obovate, 1-2 cm. long, entire or dentate; flowers dark purple; petals oblong-oblancheolate, acute, nearly twice as long as the sepals, and shorter than the purple filaments, follicles 4-5 mm. long. (*S. Rhodiola* Torr.) Alaska southward in Rockies. *S. alaskanum* (Rose). Petals purplish, obtuse; follicles 4-6 mm. long. Coast of southern Alaska.

7. *S. rosea* L. Glabrous, 1-4 dm. high, leaves obovate, the upper leaves larger, 2 cm. long or more, toothed, the lower entire, cyme dense; flowers mostly diœcious, sepals narrowly oblong, a little shorter than the greenish yellow, blunt, oblong-obovate petals; follicles 8-9 mm. long. Queen Charlotte Islands; Alaska.

8. *S. acre* L. (Mossy S.) Leaves 3-4 mm. long, thick, ovate, imbricated; a garden escape at Nakusp.

SAXIFRAGACEÆ (SAXIFRAGE FAMILY)

Herbs or shrubs, distinguished from *Rosaceæ* by the copious albumen in the seeds; by the opposite as well as alternate, usually exstipulate, leaves; by the usually definite (5 or 10) stamens, and by the few (usually 2) carpels; carpels either adherent to the calyx, or free; stamens and petals inserted on the calyx. Of the following genera Nos. 9-13 have axial placentæ, Nos. 5-8 parietal or nearly basal placentæ.

Shrubs.		
Leaves alternate, stamens 5		1. Ribes.
Leaves opposite, stamens 10		2. Philadelphus.
Herbs.		
Petals none, low herbs		3. Chrysopenium.
Petals present, or if wanting, plants not low.		
Staminodia among the stamens		4. Parnassia.
Staminodia absent.		
Petals fringed or laciniate-lobed.		
Calyx flat at base		5. Mitella.
Calyx cup-shaped at base		6. Tellima.
Petals not fringed nor laciniate-lobed.		
Stamens 3, a bud usually forming at the base of the leaf-blade		7. Tolmiea.
Stamens 5.		
Rootstock short; bulbiferous		12. Hemieva.
Rootstock long; not bulbiferous.		
Capsule 1-celled, placentæ parietal; leaves mostly basal		9. Heuchera.
Capsule 2-celled, placentæ axial; stem leafy		10. Boykinia.
Stamens 8 or 10.		
Leaves evergreen.		
Leaves thick, broad		11. Leptarrhena.
Leaves narrow		13. Saxifraga.
Leaves deciduous.		
Placentæ axial; carpels equal		13. Saxifraga.
Placentæ parietal or basal, carpels unequal		8. Tiarella.

1. RIBES (CURRANT, GOOSEBERRY)

Shrubs with palmately lobed cordate exstipulate leaves; flowers in racemes; the 5 petals much shorter than the colored calyx; stamens 5, inserted alternately with the petals on the calyx-tube; fruit a berry. (The Arabic name).

Plants without prickles, flowers rather numerous, in racemes;

(Currants).

Calyx rotate, the tube short or none.

Fruit red.

Fruit smooth or nearly so.

Leaves 6-10 cm. wide, acutely lobed, serrate 1. *R. triste*.

Leaves 1-3 cm. wide, hardly lobed, crenate 8. *R. cereum*.

Fruit glandular-bristly 2. *R. glandulosum*.

Fruit blue or black.

Raceme drooping 3. *R. acerifolium*.

Raceme erect or ascending.

Raceme 1 dm. long or more, bracts long, often foliaceous 4. *R. bracteosum*.

Raceme less than 1 dm. long, bracts short, not foliaceous.

Glands of ovary stalked, petals greenish or reddish 5. *R. laxiflorum*.

Ovary resinous, dotted, sepals white 6. *R. Hudsonianum*.

Calyx produced into a campanulate tube.

Calyx red, flowers many 7. *R. sanguineum*.

Calyx white or greenish, flowers few 9. *R. viscosissimum*.

Plants with prickles. (Gooseberries).

Flowers many on drooping racemes, calyx-tube rotate.

Berries black 10. *R. lacustre*.

Berries red 11. *R. lentum*.

Flowers few (1-4), calyx-tube campanulate.

Ovaries and fruit glandular 12. *R. Lobbii*.

Ovaries and fruit smooth.

Stamens twice as long as the petals 13. *R. divaricatum*.

Stamens about equaling the petals.

Calyx 8-12 mm. long 14. *R. irriguum*.

Calyx 5-7 mm. long 15. *R. oxycanthoides*.

1. *R. triste* Pall. (RED C.) Stems prostrate, often rooting; leaves strongly cordate, ciliate, but otherwise nearly or quite glabrous or pubescent beneath, clearly 3-obscurely 5-lobed, mucronately crenate-dentate; calyx green or purplish; racemes drooping, petals reddish, pedicels longer than the bracts; fruit resembling that of a small garden currant. Cold woods, Dewdney Trail; Hall's Prairie, and northw. The garden currant, *R. vulgare* Lam., is an occasional escape.

2. *R. glandulosum* Grauer. (SKUNK C.) Decumbent, fetid; leaves deeply 5-7 lobed, the lobes acute, glabrous above, puberulent on the veins beneath; racemes ascending, shorter than the leaves, pedicels glandular-pubescent, longer than the bracts; petals longer than broad; fruit red, bristly. Northern; Peace River.

3. *R. acerifolium* Howell. Stems erect or ascending, 1-2 m. high; leaves rather broader than long, glabrous above, beneath puberulent on the veins and glandular-dotted; the apex of the 5 lobes rounded or acute, the margin somewhat laciniately serrate, petals red; inflorescence pubescent and sparingly glandular, fruit blue-black, glaucous, bracts ciliate-glandular nearly or quite as long as the upward-curving pedicels. Dewdney Trail.

4. *R. bracteosum* Dougl. (BLUE C.) Erect 1-3 m. high; leaves 5-7-lobed, sometimes 2 dm. broad, resinous-dotted beneath, ciliate margined, nearly smooth above; racemes erect 1-2 dm. long, the lower bracts foliaceous or broadest above the middle, equaling or exceeding the pedicels; petals greenish-white; fruit resinous-dotted, very glaucous. West of the Cascades. Vancouver; V. I.; Alaska.

5. *R. laxiflorum* Pursh. Stems erect, ascending or prostrate, 1-2 m. high; leaves orbicular firm, 5-lobed, cordate, glabrous above, very slightly pubescent on the veins beneath, the lobes acutish; raceme erect, 6-12-flowered, the bracts $\frac{1}{3}$ as long as the pedicels, densely glandular; petals red; fruit, blue-black, glaucous. Skeena River to Oregon.

6. *R. Hudsonianum* Richards. (BLACK C.) Stems ascending or erect, 1-2 m. high; leaves 3-lobed or with 2 smaller ones at the cordate or rounded base, resinous-dotted and villous beneath; petals small, white; racemes erect, short, 6-12 flowered, the bracts 3-5 mm. long, short, deciduous, the small petals red; fruit black, glabrous, without bloom. Along streams east of the Cascades; Kootenay. *R. petiolare* Dougl. Leaves smoothish, more

deeply cordate, racemes 25-50-flowered, bracts minute, fruit resinous-dotted. Same range, Princeton.

7. **R. sanguineum** Pursh. (RED-FLOWERED C.) Erect, stout, 1-3 m. high, leaves 3-5 cm. broad, often not strongly cordate, 3-5 lobed, the lobes not reaching half way to the middle; smooth above, short-tomentose beneath; flowers about 1 cm. long; the red or white petals spatulate, equaling the stamens; fruit smooth, dark-blue, densely glaucous. West of the Cascades in dry soil.

8. **R. cereum** Dougl. (SQUAW C.) Low, 1 m. high or less, bark gray; leaves roundish, rather broader than long, about 2 cm. broad, with 3-5 very short lobes, crenate, puberulent on both sides, petioles puberulent; flowers 1-5, the whitish pubescent calyx tubular, 8 mm. long; bracts very broad, longer than the very short pedicels; inflorescence drooping; fruit nearly sessile, red. East of the Cascades; Lytton; Kamloops.

9. **R. viscosissimum** Pursh. (STICKY C.) Stems ascending, 6-10 dm. high; bark gray on old wood; leaves 3-8 cm. broad, the 3 short, distinct lobes round at apex, crenate-dentate, petioles densely glandular-pubescent; racemes spreading, nearly as long as the leaves, 3-7-flowered; calyx about 1 cm. long, glabrous towards summit, greenish-white or tinged with pink below; bracts obovate, greenish-yellow, 6-7 mm. long; pedicels 1 cm. long or less; fruit glandular-pubescent, black. Cascades to Rockies; Mt. Fernie.

10. **R. lacustre** Poir. (SWAMP G.) Stems erect or ascending, 0.8-1 m. high, densely prickly at least when young, with groups of larger, weak prickles at the nodes; leaves cordate, 3-5 lobed, with stiff scattered hairs, the petioles bristly-ciliate; style and stamens short, not longer than the petals; fruit black, bristly. Common, Atlantic to-Pacific. Vancouver; Alaska.

11. **R. lentum** (Jones) Coville and Rose. Similar; stems often almost naked, leaves finely pubescent, racemes with fewer (5-9) flowers; berry red. Fraser Canyon and eastw.; Wn.

12. **R. Lobbii** Gray. (RED-FLOWERED G.) Stout, 1-2 m. high; prickles usually in 3's; leaves 3-5-lobed, glandular-pubescent, especially on the petioles; peduncles 2 cm. long, the 2 flowers about 1.5 cm. long; calyx red, its tube longer than the acute, lanceolate, erect, lobes; stamens exerted 3-4 mm; fruit dark-purple, 12 mm. in diameter. Dry woods, V. I., and Islands, Gulf of Georgia.

13. **R. divaricatum** Dougl. (COMMON G.) Tall, branches not usually bristly; prickles 1-2 cm. long, often deflexed, solitary or in 2's or 3's; leaves 3-5 lobed, slightly pubescent on both sides, hardly glandular beneath; pedicels glabrous 8-12 mm. long, the bracts very short; sepals purplish or greenish, reflexed, about 4 mm. long, twice as long as the petals and the calyx-tube; fruit smooth, purple. Common west of the Cascades.

14. **R. irriguum** Dougl. Tall, 1-3 m. tall; young shoots often without bristles, the older branches usually bristly, prickles 1 cm. long; leaves nearly or quite glabrous above, pubescent and minutely glandular beneath; bracts about as long as the short pedicels; sepals greenish-white, 5-8 mm. long, about twice as long as the white petals. Cascade Mts. above Yale to the Columbia.

15. **R. oxyacanthoides** L. (SMOOTH G.) Low, 3-6 dm. high; sometimes prostrate, the old branches usually bristly; prickles hardly 1 cm. long, leaves closely pubescent on both sides, or glabrous above, more or less glandular beneath and on the petioles; peduncles and pedicels short, the latter 3-5 mm. long; sepal lobes erect, whitish, 3-4 mm. long, a little longer than the tube; petals about as long as the stamens, and two-thirds as long as the sepals. Kootenay; Rockies and northward; Crow's Nest Pass.

2. PHILADELPHUS (MOCK ORANGE)

Shrubs with opposite exstipulate leaves and large white flowers; ovary nearly or quite inferior, stamens 20 or more, styles 3-5, united for $\frac{1}{2}$ - $\frac{2}{3}$ their length; capsule usually 4-celled, 4 valved. (An ancient name, adopted by Linnæus).

1. **P. Lewesii** Pursh. Shrub, 1-3 m. high; bark of previous season's growth with conspicuous cross cracks and sooner or later peeling off; leaves ovate, entire or denticulate, pubescent only on the veins beneath; styles united for $\frac{1}{2}$ their length; petals 1-2 cm. long. East of the Cascades. **P. Gordonianus** Lindl., the form west of the Cascades, has leaves more dentate and pubescent beneath over the whole surface; styles united for $\frac{2}{3}$ of their length; and the bark of the previous season not exfoliating.

3. CHRYSOPLENIUM (GOLDEN SAXIFRAGE)

Low glabrous herbs, growing in very wet places, with fleshy leaves and small, greenish-yellow, solitary, flowers; calyx rotate; sepals 4, petals none, stamens 4 or 8; capsule 1-celled with 2 parietal placenta (Greek *chrysos*, gold, *splen*, the spleen, in allusion to medicinal properties).

1. **C. tetrandrum** Fries. Stems erect, 4-12 cm. high; leaves alternate, reniform, cordate, lobed, doubly crenate; flowers corymbose, stamens 4. Rockies; Selkirk; Alaska.

2. **C. glechomæfolium** Nutt. Stems ascending 4-15 cm. high; leaves opposite, roundish, cuneate at base, crenate; flowers mostly solitary, stamens 8. West of the Cascades; B. C. to Oregon.

4. PARNASSIA (GRASS OF PARNASSUS)

Glabrous perennials with entire leaves and solitary white flowers on scape-like stems; ovary 1-celled, with usually 4 parietal placenta, stigmas 4; alternating with the 5 stamens are glanduliferous scales, (sterile filaments or staminodia).

Petals fringed at the base 1. **P. fimbriata**.
Petals entire.

Basal leaves cordate or rounded, petals longer than sepals.

Petals 8-9 mm. long, a little longer than the lanceolate sepals;
staminodial glands 9-10

3. **P. montanensis**.

Petals 10-13 mm. long, much longer than the ovate sepals;
staminodial glands 9-15

2. **P. palustris**.

Basal leaves not cordate; petals about equaling the sepals,
staminodial glands 5-7.

Stems with a single bract

4. **P. parviflora**.

Stems bractless, staminodial glands 3-5

5. **P. Kotzebuei**.

1. **P. fimbriata** Banks. (FRINGED G. OF P.) Scape 1-2.5 dm. high, with a clasping cordate leaf at the middle or slightly above; leaves reniform-cordate, with a broad sinus: staminodia 5-9 in each set; petals nearly twice as long as the elliptical obtuse sepals. Wet rocks and banks along the coast, and in the Mts.; V. I. to Rockies.

2. **P. palustris** L. (MARSH G. OF P.) Stems 1-3 dm. high with a clasping cordate leaf at or below the middle; radical leaves rather petioled; petals ovate, about 10-veined; staminodia 9-15 in each set; calyx-tube inconspicuous, capsule about 1 cm. long. Alaska to Atlantic. Apparently replaced in our southern Rockies by the next.

3. **P. montanensis** Rydb. & Fer. (MT. G. OF P.) Stems 1-2 dm. high, with a clasping cordate, ovate or lanceolate bract below the middle or near the base; petiole a little shorter or much longer than the blade; petiole of the radical 1-3 times as long as the blade; petals oval to obovate, about 5-veined; staminodia 7-10 in each set; calyx-tube conspicuous; capsule not twice as long as the calyx, about 1 cm. long. Common in the Rockies; Golden.

4. **P. parviflora** D.C. (SMALL-FLOWERED G. OF P.) Stem 1-2.5 dm. high, with an ovate bract below the middle; radical leaves ovate or oval, tapering to a petiole equaling or longer than the blade; petals 5-7-nerved, elliptical to oblong, 5-9 mm. long, slightly exceeding the oblong or elliptical calyx-lobes; staminodia 4-7, capsule less than twice as long as the sepals. In wet places, Columbia Valley.

5. **P. Kotzebuei** C. & S. Scape 1 dm. high, usually leafless, sometimes with an oval bract near the base; leaves ovate to oval, narrowed at base to a short petiole; petals 3-veined; calyx-lobes oblong, staminodia 3-5 in each set; capsules twice as long as the sepals. Arctic region southward in Rockies; Selkirks. Very like the preceding.

5. MITELLA (MITREWORT)

Slender perennials with round-cordate basal leaves, and naked or few-leaved stems; flowers usually in simple racemes, white or greenish, calyx short, more or less adnate to the 1-celled ovary; stamens 10, 5 or 3; styles short. (Dim. of *L. mitra*, a mitre; descriptive of the capsule).

Stamens 10, ovary adherent at base	1. <i>M. nuda</i> .
Stamens 5.	
Stamens opposite the petals, ovary inferior	2. <i>M. pentandra</i> .
Stamens alternate with the petals.	
Petals pinnatifid, greenish, ovary inferior.	
Stems with 1-3 leaves	3. <i>M. caulescens</i> .
Stems leafless.	
Leaves reniform-orbicular	4. <i>M. Breweri</i> .
Leaves ovate	5. <i>M. ovalis</i> .
Petals white, trifid, ovary half inferior	6. <i>M. trifida</i> .

1. **M. nuda** L. Slender, producing long runners; stems leafless, pubescent, 0.5-2 dm. high; leaves round-reniform, doubly-crenate, 1.2-2.3 cm. in diameter; flowers few, distant, on short, bractless pedicels; petals greenish, pinnate; sepals green. Cool woods, Atlantic to Pacific. Golden; Field; Crow's Nest Pass; Alaska.

2. **M. pentandra** Hook. Stems slender, puberulent, scape-like, 1-3 dm. high; leaves round, reniform, indistinctly 9-11 lobed, doubly-crenate, 3-4 cm. broad, sparingly pubescent, with short, white hairs, petioles nearly glabrous; flowers many, singly or in pairs, with small bracts, petals with 7-9 pinnæ; calyx-lobes obtuse. Wet places in the mts.; common.

3. **M. caulescens** Nutt. Retrorsely hispid and minutely scabrous; leaves broadly cordate, 2.5-5 cm. broad, 3-5 lobed, crenate; flowers somewhat cymose, in a long, slender panicle on long, slender pedicels; pinnæ of petals 7-9. Mt. streams; Chilliwack River.

4. **M. Breweri** Gray. Similar, sparingly pubescent with long brown, or white, somewhat cobwebby hairs, which are more abundant on the petioles; leaves reniform, 4-8 cm. broad, indistinctly lobed, crenate, calyx-lobes rounded, somewhat scarious, petals with 3-5 pinnæ; pedicels short. Along mt. streams and in wet places, mts.; Mt. Crown; Roger's Pass.

5. **M. ovalis** Greene. Retrorsely pubescent with brownish or whitish hairs, which are most abundant on the petioles; leaves oblong-ovate, indistinctly 9-15 lobed, apicately crenate, 3-6 cm. long, the pubescence of scattered coarse white hairs; flowers many, singly or in pairs; pinnæ 3-5, calyx-lobes rounded. Along streams, V. I.; Nanaimo; and doubtless on the mainland.

6. **M. trifida** Grah. Scape glandular-puberulent, 2-3 dm. high, naked; petioles retrorsely hairy, at least above, the orbicular-reniform to ovate blades sparingly hairy on both sides, cordate, crenate, slightly lobed; racemes short, often secund; petals one-half longer than the sepals, white with a long claw, deeply trifid at apex; calyx about 2 mm. long, the midrib branching above the middle. Common in Kootenay; Armstrong; Mt. Fernie. **M. stauropetala** Piper. Midrib of sepal not branching, petal cleft to below the middle is to be looked for in southern Kootenay.

6. TELLIMA (FRINGE-CUP)

Perennials with palmately-lobed, parted or divided leaves; stems few-leaved; flowers racemose; petals laciniate, stamens 10, included; capsule 2-valved, adherent to the base of the slightly inflated calyx. (An anagram of *Mitella*).

Stamens 5 1. *T. racemosa*.

Stamens 10.

Carpels 2, plants 6 dm. high, petals yellowish and pinkish, inflorescence long.

Ovary adnate to calyx at base; flowers not fragrant 2. *T. grandiflora*

Ovary adnate to calyx for half its length; flowers fragrant 3. *T. odorata*.

Carpels 3; plants 1-3 dm. high, petals pink, inflorescence short.

Calyx obconical, petals mostly 3-cleft 4. *T. parviflora*.

Calyx campanulate, petals 3-7-cleft 5. *T. tenella*.

1. ***T. racemosa*** (S. Wats) Greene. Stems and petioles puberulent and glandular; stems 1-2 dm. high, with a few leaves which have membranous stipules; leaves puberulent, cordate, orbicular or reniform, the short, rounded lobes crenate; inflorescence a short, dense raceme; petals white, broad-clawed, with 3-5 short, ciliate lobes. (*Heuchera racemosa* S. Wats., *Elmera racemosa* Rydb.) Mt. Cheam.

2. ***T. grandiflora*** Dougl. Hispid-pubescent, glandular; leaves 3-9 cm. in diameter, round-cordate with shallow lobes; inflorescence 1-2 dm. long; calyx cylindro-campanulate with a turbinate base, the tube about 8 mm. long; sepals ovate, petals yellowish or red, fringed, clawed. Alaska to California. Revelstoke. (*T. breviflora* Rydb. Tube of calyx scarcely longer than the oblong sepals; same range).

3. ***T. odorata*** Howell. Similar; more hirsute; calyx-tube lighter in color, turbinate-campanulate, 6-mm. long, the petals with a narrower claw and broader limb; raceme finally secund. Same range. Vancouver.

4. ***T. parviflora*** Hook. Stem with spreading glandular pubescence, 1.5-3 dm. high, from a corm-bearing root; leaves soft-pubescent, 3-lobed or 3-cleft, the divisions cleft; flowers 1.5-2 cm. broad, petals whitish-pink, clawed; ovary half-inferior; rarely producing bulblets. Grassy places, Victoria; Yale; Armstrong; Rockies.

5. ***T. tenella*** Walp. Stem more slender, puberulent glandular or glabrate, 1-2 dm. high, from a corm-bearing root; leaves 3-5-cleft, the divisions cleft; ovary free except at base, rather scantily short-hairy; flowers 12-15 mm. broad, petals pink, clawed; sometimes with bulblets in the inflorescence. Victoria; Kamloops.

7. TOLMIEA

Perennial, stems more or less leafy, leaves stipulate; flowers racemose; calyx-tube long, open on one side; petals filiform; stamens 3; placentæ parietal, ovary 1-celled, carpels equal. (*Leptaxis*). Dr. W. F. Tolmie, d. 1886, collected plants for Hooker).

1. ***T. Menziesii*** Push. Rather slender, pubescent, 4-6 dm. high; basal leaves 4-8 cm. wide, cordate, long-petioled, the short marginal lobes toothed, often with a bud at the base of the blade; mature carpels 10-15 mm. long. Woods, Coast.

8. TIARELLA (FALSE MITREWORT)

Perennial herbs with leafy flowering branches, small fringed stipules and elongate panicles of small, white flowers; stamens 10, well exerted, petals 5; ovary 1-celled with 2 parietal nearly basal placentæ; the values of the ripe capsule very unequal.

Leaves not divided 1. *T. unifoliata*.

Leaves ternate.

Leaf divisions lobed 2. *trifoliata*.

Leaf divisions laciniate 3. *laciniata*.

1. **T. unifoliata** Hook (SIMPLY LEAVED T.) Glabrous below, glandular above, 1.5-4 dm. high; leaves round-ovate, cordate, 3-5-lobed, crenate; inflorescence a narrow panicle; petals linear, much longer than the whitish sepals; valves of ovary 9-11 and 5-6 mm. long. Woods, Selkirks and Rockies; Alaska; Coast Mountains.

2. **T. trifoliata** L. (THREE-LEAVED T.) Pubescent from base or glabrous below, glandular above, 3-5 dm. high; leaflets coarsely toothed with about 3 more or less evident lobes; inflorescence compound, narrow; petals sometimes pink, linear, much longer than the sepals; valves 6-9 and 3-4 mm. long. Woods, Coast; Alaska.

3. **T. laciniata** Hook. (CUT-LEAVED T.) Similar, less pubescent, but the hairs stiffer; more delicate, the leaflets deeply twice cleft. Mt. Streams, Mt. Arrowsmith to Alaska.

9. HEUCHERA (ALUM ROOT)

Perennials with radical leaves and scape-like stems bearing whitish flowers in spicate or paniculate inflorescences; ovary half-inferior, petals small, entire, or wanting; calyx often whitish; capsule 1-celled with 2 parietal placentæ. (Heucher was a German botanist).

Stamens longer than the sepals; inflorescence open; calyx 2-3 mm. long.

Leaf-lobes rounded, crenate	1. <i>H. micrantha</i> .
Leaf-lobes acute, serrate	2. <i>H. glabra</i> .
Stamens shorter than the sepals, inflorescence spicate.	
Calyx 2-3 mm. long.	3. <i>H. parvifolia</i> .
Calyx 6-9 mm. long	
Petioles long-pubescent.	
Leaf-blades roundish	5. <i>H. cylindrica</i> .
Leaf-blades oval	4. <i>H. ovalifolia</i> .
Petioles glabrous or nearly so	6. <i>H. glabella</i> .

1. **H. micrantha** Dougl. Villous below with long, white or brownish hairs on the petioles; stem leafless, 3-6 dm. high; leaves ovate, cordate, slightly many-lobed, blades 4-8 cm. long; panicle large, diffuse, with minute linear bracts; petals narrow with filiform claws. Rocky bluffs, Coast and V.I.

2. **H. glabra** Willd. Slightly pubescent or glabrous, stem with 1-3 leaves, 2-4 dm. high; leaves ovate, cordate, 4-5 cm. long, about 7-lobed; petals ovate, with a long claw; bracts of the inflorescence narrowly lanceolate. Mts. and mt. streams; Alaska, southward.

3. **H. parvifolia** Nutt. Scapes naked 1-4 dm. high, glandular-pubescent; leaves reniform-orbicular-cordate, crenately 5-7 lobed, 2-4 cm. broad; inflorescence becoming elongated; petals yellowish or creamy, small, spatulate, scarcely exceeding the calyx-lobes. Rocky ridges, Rockies; Trail.

4. **H. ovalifolia** Nutt. Glandular-hirsute, 3-6 dm. high; leaf-blades 3-5 cm. long, glandular-pubescent, oval, slightly cordate or truncate at base, 5-7 lobed, crenate; inflorescence dense or interrupted, 5-10 cm. long; flowers 6-8 mm. long, creamy, the calyx-tube greenish-yellow, petals usually wanting. Lytton and Kamloops to Rockies.

5. **H. cylindrica** Dougl. Differs from *H. ovalifolia* in the roundish, deeply cordate leaves and the greenish flowers. Kootenay.

6. **H. glabella** T. and G. Scape glandular-puberulent or glabrous; petioles glabrous or slightly glandular-puberulent; leaves round-oval, cordate at base, mostly glabrous except on the margins; inflorescence mostly interrupted, 5-14 cm. long, flowers creamy. Lake Louise; Nelson; Crow's Nest Pass. (*H. columbiana* Rydb. Differs in the hirsute petioles. Rockies).

10. BOYKINIA

Perennials with leafy stems and open cymes of white flowers; stamens 5; petals 5, entire; capsule 2-celled with central placentæ. (Boykin was an American botanist).

1. *B. occidentalis* T. & G. Pubescent with brown hairs, glandular above 3-5 dm. high; leaves round-cordate, incisely 3-5 lobed, serrate, the base of the petioles with long hairs; petals twice as long as the calyx, white, narrowed to a claw. Wet places, Coast region; Vancouver.

This species is subdivided in the North Am. Fl. into the following, which may be regarded as varieties.

Branches of inflorescence dichotomous-cymose with 2 racemiform secund branches, pedicels curved.

Calyx-tube densely glandular; more or less purplish; leaf-blades comparatively firm; petioles decidedly hirsute.

B. circinnata.

Calyx-tube sparingly glandular, green, leaf-blades very thin; petioles glabrous or with a few hairs.

B. occidentalis.

Branches of the inflorescence irregularly cymose, neither racemiform nor secund, pedicels straight, even in fruit.

Sepals in fruit erect or ascending; inflorescence densely glandular, usually purplish.

B. elata.

Sepals in fruit reflexed or spreading, inflorescence puberulent and with a few glandular hairs; green.

B. vancouverensis.

B. circinnata (Rosen & Rydb.) Cowichan, V. I. *B. elata* Greene. (*B. occidentalis elata* Gray). Not rare on V. I.; Vancouver. *B. vancouverensis* (Rydb.) Goldstream, Ucluelet.

11. LEPTARRHENA (PEAR-LEAF)

Nearly stemless, the thick leaves on short caudices; scape with about 2 small leaves; the small flowers paniced, calyx-tube short; petals 5, white; stamens 10; carpels 2, united at base.

1. *L. amplexifolia* (Sternb.) Ser. Glabrous except the inflorescence; 1-5 dm. high; leaves obovate, crenate-serrate, tapering to a short petiole, green above, whitish beneath; flowers short-pedicled in cymules; stamens not exerted; follicles usually purple. (*L. pyrolifolia* Ser.) Common in the Coast Mts.; Alaska.

12. HEMIEVA

Rootstocks bearing bulblets, leaves roundish, lobed, stamens 5, ovary almost wholly inferior; the stem-leaves with foliaceous stipular bases; otherwise much as *Saxifraga*.

Petals violet, with long claws 1. *H. violacea*.
 Petals white with short claws 2. *H. ranunculifolia*.

1. *H. violacea* Wheelock. Glandular-pubescent, 1-2 dm. high; the radical leaves bulb-bearing at the base, leaves round-cordate, crenately lobed and toothed, petioled, petals spatulate, much longer than the acuminate lobes of the calyx; carpels united to near the top. Kaslo; eastern Wn.

2. *H. ranunculifolia* Raf. Glandular-pubescent, 1-2.5 dm. high, basal leaves petioled, bulb-bearing at base, buttercup-like, 3-lobed, the lobes coarsely 3-toothed; petals white, or yellowish at base, oblong or obovate, obtuse, twice as long as the acute calyx-lobes; carpels united only at the base. Damp mt. cliffs; Cheam; Glacier; Rockies; Alaska.

13. SAXIFRAGA (SAXIFRAGE)

Mostly low perennials; calyx 5-toothed, free from or adhering to the base of the ovary; petals entire; styles 2, capsule 2-beaked. (*L. saxum*, a rock, and *frangere* to break, in allusion to the habitat of many species which root in the clefts of rocks).

- Leaves crowded, decussately opposite; petals purple, 6-8 mm. long . . . 1. *S. oppositifolia*.
 Leaves not decussately opposite.
 Stems leafy, at least below, though often scape-like above; plants often tufted; leaves broad or narrow; hypanthium well developed, finally longer than the sepals.
 Petals yellow.
 Leaves entire.
 Plants stoloniferous 2. *S. flagellaris*.
 Plants not stoloniferous.
 Petals 4 mm. long, equaling the stamens, leaves sharp . . . 3. *S. Van Bruntlæ*.
 Petals longer, exceeding the stamens, leaves obtuse.
 Petals 1 cm. long; follicles 10 mm. long . . . 4. *S. Hirculus*.
 Petals 5-7 mm. long; follicles 5 mm. long . . . 5. *S. serpyllifolia*.
 Petals white, creamy or spotted.
 Leaves, in part at least, evergreen, longer than broad.
 Leaves entire.
 Leaves glabrous, oval 6. *S. Tolmiei*.
 Leaves spinulose-margined, lanceolate 7. *S. bronchialis*.
 Leaves not entire.
 Leaves rigid, the 3 teeth spinescent-tipped . . . 8. *S. tricuspidata*.
 Teeth or lobes not spinescent-tipped.
 Leaves merely toothed 9. *S. adscendens*.
 Leaves 3-lobed at apex.
 Petals 2.5-3.5 mm. long 11. *S. delicatula*.
 Petals 4-7 mm. long 10. *S. cæspitosa*.
 Leaves annual, roundish.
 The axils of the upper leaves bulb-bearing; flower solitary, leaves more than 1 cm. wide . . . 12. *S. cernua*.
 The axils normal, flowers usually several; leaves less than 1 cm. wide.
 Leaves 3-5 lobed; petals clawless 13. *S. rivularis*.
 Leaves crenate; petals abruptly clawed 14. *S. debilis*.
 Stems scapose, leaves all basal, broad; plants usually not tufted; hypanthium slightly developed, flattish, shorter than calyx.
 Petals not uniform.
 Inflorescence leafy-bracted 16. *S. Newcombei*.
 Inflorescence not leafy-bracted.
 Pubescence pale 15. *S. Bongardi*.
 Pubescence reddish 17. *S. ferruginea*.
 Petals uniform.
 Filaments subulate or filiform.
 Inflorescence dense or in dense cymes.
 Stamens equaling or longer than petals; capsule oblong . . . 18. *S. nivalis*.
 Stamens shorter than the petals; capsules ovate.
 Petals notched at apex 19. *S. bidens*.
 Petals entire 20. *S. integrifolia*.
 Inflorescence of open cymes; leaves red-tomentose beneath. 21. *S. rufidula*.
 Filaments clavate (slightly enlarged above the middle).
 Leaf-blades ovate-oblong, tapering to a petiole; flowers in cymes or a dense head.
 Leaves often red-pubescent beneath; pedicels shorter than the flowers 22. *S. occidentalis*.
 Leaves not red-pubescent beneath; pedicels longer than the flowers 23. *S. lata*.
 Leaves roundish, not tapering to a petiole; flowers mostly in an open panicle.
 Leaves fan-shaped or obovate 24. *S. Lyallii*.
 Leaves orbicular.
 Flowers in a spike-like panicle 28. *S. spicata*.
 Flowers not in a spike-like panicle.
 Leaves with short dentate lobes, the inflorescence bulb-bearing 25. *S. Mertensiana*.
 Leaves dentate, inflorescence not bulb-bearing.
 Inflorescence compact 26. *S. Nelsoniana*.
 Inflorescence open 27. *S. arguta*.

1. *S. oppositifolia* L. Stems numerous, in tufts, prostrate, very densely leafy; leaves opposite, ovate or obovate, 2-3 mm. long, fleshy, keeled, bristly-ciliate; flowers solitary on short peduncles, petals purplish, sometimes white, much longer than the obtuse calyx-lobes, calyx ciliate, free from the ovary. Alpine, Rockies; Mt. Queest, Shuswap; Alaska.

2. *S. flagellaris* Willd. Stems erect, leafy, glandular-pubescent, 1-5-flowered; stolons from the axils of the basal-leaves long and filiform; leaves glandular, obovate-spatulate below, ciliate, entire, flowers large, petals yellow, obovate-cuneate, 2-3 times longer than the sepals and stamens;

calyx very glandular, nearly free from the ovary, the lobes equaling or longer than the tube. Arctic, southward in the Rockies.

3. *S. Van Bruntiae* Small. Stems ascending, solitary or tufted, glabrous or slightly pubescent, 0.5-1.5 dm. long, with few to several corymbose flowers, leaves numerous, fleshy, 1 cm. long, linear-oblong, more or less spinulose-ciliate, petals yellow spotted with orange, oblong, $1\frac{1}{2}$ times as long as the sepals; stamens equaling the petals. Alpine rivulets, Rockies. Field. (*S. aizoides* L. in part).

4. *S. Hirculus* L. Erect from a slender caudex with glabrous or slightly pubescent simple stems, 1-2 dm. high, leaves lanceolate or linear-oblong obtuse, the lower spatulate, short-petioled, 2-3 cm. long, attenuate to a ciliate petiole evenly distributed, and not very numerous on the stem; flowers solitary (or rarely 2-3) bright yellow, sometimes spotted scarlet, obovate, nodding, 3 times as long as the reflexed calyx-lobes; stamens half as long as the petals, often ciliate, the capsule nearly free from the calyx. Alaska to the Saskatchewan.

5. *S. serpyllifolia* Pursh. Tufted, the leaves crowded on the stems, which above are nearly naked and one-flowered; leaves 6 mm. long, thickish, spatulate, obtuse, alternate at base, entire, glabrous, slightly cartilaginous on the margin; calyx-lobes finally reflexed, ovate; petals obovate, more than twice as long as the calyx-lobes, golden-yellow; styles a little spreading. Alaska southward to Wn.

6. *S. Tolmiei* T. & G. Low, loosely tufted, 1 dm. or less high, the peduncles naked to the inflorescence and usually longer than the densely leafy stems; leaves oval 4-5 mm. long, evergreen, flowers 1-4, petals white, sometimes pink, 3-4 mm. long, twice as long as the oblong, obtuse calyx-lobes; capsule 7 mm. long, adnate at base to the deeply cleft calyx. Alpine, near the melting snow. Mt. Crown, North Vancouver; Mt. Cheam.

7. *S. bronchialis* L. (COMMON S.) Tufted, 2-3 dm. high, stems ascending, bracted above, densely leafy below, producing bracted scapose stems many times as long; leaves lanceolate, 5-10 mm. long, evergreen; flowers few to many, petals white, usually spotted, 5-6 mm. long, much longer than the ovate obtuse calyx-lobes; capsule 5-6 mm. long, adnate at base to the deeply cleft calyx. Alpine, on all our Mts. and northward to Alaska. There are several forms:—In the typical the petals are 6.5 mm. long, pale greenish-yellow, orange-spotted below the middle, broadly unguiculate at base; the stamens equaling or exceeding the corolla; the style $\frac{2}{3}$ the length of the ovary. Alaska. In the var. *austromontana* (Wiegand) Piper, the petals are 5.5 mm. long, white spotted with orange dots below the middle and purple dots above, not at all unguiculate; the stamens are shorter than the petals; the style is $\frac{1}{2}$ the length of the ovary; the common form southward. Var. *cherlerioides* Don. Densely tufted, 5-8 cm. high, leaves short, subspatulate, sharply mucronate, flowers few. Northern, Gatcho Lake.

8. *S. tricuspidata* Rottb. Tufted, stems nearly naked above, leaves hardly 1 cm. long, crowded at base, oblong or spatulate with 3 rigid sharp teeth, the margins ciliate, flowers several, about 1 cm. broad, petals oblong-obovate, capsule nearly free from the calyx. Northern.

9. *S. adscendens* L. Low, glandular simple or sparingly branched, or tufted, 3-8 cm. high, from a slender caudex, leaves obovate-spatulate, the lower 3-toothed, or some of them entire, hispid-ciliate; flowers several, petals obovate-cuneate, white, pink, or greenish veined at base, twice as long as the calyx; calyx-tube wholly adnate to the ovary and longer than the lobes, which are often brown; stamens hardly exceeding the calyx-lobes. Alpine; Cheam; Rockies.

10. *S. cæspitosa* L. (TUFTED S.) Densely tufted, the short densely-leafy stems surmounted by a comparatively stoutish, glandular-pubescent scape, hardly 1 dm. high; leaves 1-1.5 cm. long, glandular, ciliate, mostly

3-lobed, narrowed to a broad base; flowers 3-few, calyx campanulate at base at flowering; sepals ovate; petals 4-6 mm. long; follicles 5-7 mm. long, nearly half inferior. V.I. to Rockies; Alaska; Shawnigan Lake. *S. monticola* (Small) (*S. exarata* Hook.) sepals oblong-lanceolate, petals 4-5 mm long, scapes slender, calyx turbinate at base. Rockies, Banff.

11. *S. delicatula* Rydb. Similar scapes slender, flowers 1-2, calyx turbinate at base, sepals 2-2.5 mm. long; follicles 3.3-5 mm. long. Alberta to Montana.

12. *S. cernua* L. (NODDING S.) Stems 1-2 dm. high, with distant leaves, glandular hairy; leaves short-petioled, round-reniform, distinctly 3-7-lobed, becoming bract-like above, 2 cm. broad, and bearing bulbs in the upper axils; flower usually solitary, nodding, petals large, white, obovate, 3 times as long as the ovate calyx-lobes; calyx nearly free from the ovary. Rockies, Lake Louise, and far northward.

13. *S. rivularis* L. (ALPINE BROOK S.) Stems tufted or solitary, 3-9 cm. high, slender, 1-3-flowered, glabrous or sparingly pubescent; leaves slightly fleshy, long-petioled, 3-7- (mostly 3-) lobed, 4-8 mm. broad, or the upper entire; flowers small, erect, petals ovate-oblong, acute; calyx-lobes ovate, obtuse, shorter than the tube; carpels oblong, adnate below. Alpine, Rockies and far northward. Var. *hyperborea* R. Br. Stems often only 2.5 cm. high, about 2-flowered, leaves very smooth, rarely slightly glandular. Alaska; Rockies.

14. *S. debilis* Engelm. Glabrous or sparingly glandular-pubescent, stems weak, 5-10 cm. high, 2-4 flowered, radical leaves small, crenately lobed, the cauline 3-lobed or entire; petals ovate, obtuse, twice as long as the calyx, white or pinkish, calyx-tube wholly adnate to the ovary. (?) Mts. southwards.

15. *S. Bongardi* Presl. Pursh. Glandular-pubescent 1-4 dm. high; leaves thick, hirsute, with pale hairs, at least on the upper face, oblanceolate, acutish, tapering to a broad, ciliate petiole, 2-6 cm. long, denticulate to serrate above the middle; inflorescence open, bracts small, flowers often replaced by bulb-lets, especially in mountain forms, 2 lower petals lanceolate, 3 upper ovate or spade-shaped with a claw and 2 yellow spots at the base of the blade; filaments subulate; sepals nearly distinct, obtuse, reflexed, nearly glabrous; follicles 5.5-6.5 mm. long. Common; grassy dry bluffs; Bowen Island; Lytton; also in the mts., Cheam to Rockies. (*S. stellaris* Brunoniana, *S. notkana*, *S. Vreelandii*).

16. *S. Newcombei* Small. Pubescent, often shaggy-pubescent below, 2-5 dm. high; leaves spatulate to cuneate-obovate, coarsely toothed towards the apex, very short-petioled; petals 5-7.5 mm. long, 3 shovel-shaped, with 2 yellow spots at base, 2 lanceolate. Capilano Valley; Queen Charlotte Islands.

17. *S. ferruginea* Graham. Similar; 1-1.5 dm. high; pubescence throughout ultimately reddish; leaves copiously pubescent, especially beneath; petals 3-5.4 mm. long; follicles 4.5-5 mm. long. Northern.

18. *S. nivalis* L. (ALPINE S.) Scapes 4-15 cm. tall, very glandular above; leaves 1.5-4 cm. long, the blades ovate, crenate-serrate, purple beneath, abruptly narrowed to petioles; inflorescence dense with a leafy, purplish bract or two; petals mostly obtuse, about 3 mm. long; follicles 3.5 mm. long, purple, with spreading tips. Alaska and northward; replaced in the southern Rockies of our range by *S. rhomboidea* Greene. Leaves oblong-ovate, inflorescence with narrow bracts. Mt. Garibaldi.

19. *S. bidens* (Small). Leaves erect or ascending, 3-7 cm. long, denticulate, more or less ciliate, often thinly pubescent above, narrowed to relatively slender petioles, shorter than the blade; 3-4 cm. tall, glandular-villous; cymules in clusters terminating the slender branches; petals 4-4.5 mm. long, more than twice as long as the sepals, 2-toothed at apex, clawed; filaments

subulate, follicles about 3 mm. long, the tips ultimately spreading. Cedar Hill, Victoria.

20. *S. integrifolia* Hook. Stem stout, very glandular, 1-3 dm. high; leaves 3-8 cm. long, 1-2 cm. broad, ovate-oblong, obtuse, entire, or usually denticulate, rarely dentate, tapering to a long or short petiole, glabrate except on the margins; flowers in a close cluster or in close panicle clusters; filaments short, anthers usually reddish; petals clawless, entire, obovate, not twice as long as the calyx-lobes, which are finally reflexed and equal the calyx-tube; carpels separate to the base. Common at the Coast.

21. *S. rufidula* (Small). Scapes 5-15 cm. tall, purple, pubescent below, glabrate above, corymbosely branching; leaves thick, ovate or oval, crenate, glabrous or nearly so above, red-tomentose beneath, petiolate; sepals obtuse, petals white, 4-5 mm. long, suborbicular, short-clawed, follicles 3 mm. long, purple, the stout tips spreading at maturity. Mt. Finlayson, V. I. (Near *S. occidentalis*, but with subulate filaments).

22. *S. occidentalis* Wats. Stems pubescent, more or less glandular above, but the sepals glabrous; leaves ovate to oblong or obovate, dentate, usually pubescent and often purple and red-pubescent or tomentose beneath, 2-4 cm. long, including the petiole; inflorescence rather close, at least at flowering; calyx divided nearly to the base, sepals reflexed, obtuse; filaments dilated at middle, nearly equaling the white, elliptical-obovate, entire petals; carpels divergent, divided nearly to the base. Cascades to Rockies; Mt. Cheam; Arrowhead; Mt. Fernie.

23. *S. lata* Small. Stem pubescent below, glandular above, 1.5-2.5 dm. high; leaves oblong or ovate, crenate-dentate, finely pubescent, at length glabrous except on the margins, tapering to a petiole; inflorescence somewhat pyramidal and open, the branches slender, cymules 4-6-flowered, rather loose, the pedicels slender, twice as long as the flowers; petals orbicular to elliptical, not twice as long as the soon reflexed sepals, not clawed; filaments slightly broader above the middle. Lytton.

24. *S. Lyallii* Engler. Glabrous throughout, or glandular above, 1.5-4 dm. high; leaves erect, obovate, tapering to a margined petiole, 2-5 cm. long, coarsely and sharply dentate above the middle; inflorescence many-flowered, open; the long branches and pods purple, calyx deeply cleft, the sepals acute, reflexed, the petals round-obovate, longer than the sepals; filaments broadest in the middle, carpels 6-10 mm. long, often 3-5, styles not divaricate. Alpine, damp meadows; Cheam to Rockies; Alaska.

25. *S. Mertensiana* Bong. Glandular-pubescent, 3-4 dm. high; leaves round-cordate, obscurely 8-10 lobed, the lobes dentate, on petioles 2-4 times as long; inflorescence open, pedicels slender, often 2 cm. long, petals white, clawed, with 2 yellow spots, longer than the lanceolate reflexed sepals. Mt. streams and meadows in the Coast Region; Alaska.

26. *S. Nelsoniana* Don. Scape 1-2 dm. high, more or less pubescent-glandular or villous above; leaves deeply cordate, usually sparingly pubescent, coarsely toothed, the long petioles often villous; petals white, broadly oblong, 3-4.5 mm. long, with short claws. Alaska to Wn.

27. *S. arguta* Don. Scape 1.5-4 dm. high, glabrate, except the slightly glandular-pubescent inflorescence; panicle above; leaves deeply cordate, usually glabrous, coarsely crenate-dentate, the teeth very regular, the long petioles glabrate; petals white 2.5-3.5 mm. long, with short claws. (*S. æstivalis*, *S. punctata*, *S. odontophylla*). Alaska to Wn., in the mountains.

28. *S. spicata* Don. Stems 2-4 dm. high, glandular-pubescent; leaf blades suborbicular, thick, 3-5 cm. broad, dentate or crenate-dentate, minutely pubescent on both sides, deeply cordate at base, as long as the more pubescent petioles or longer; cymules few-flowered, open, with the lower peduncles but slightly longer than the upper; sepals reflexed, 2 mm. long, petals white 3-5 mm. long; filaments slender-clavate; follicles erect with spreading tips. Alaska and northern B. C.

ROSACEÆ (ROSE FAMILY)

Herbs, shrubs or trees; leaves stipulate or exstipulate, the stipules often caducous; flowers regular, stamens 1-many, inserted on the receptacle, with the usually 5-petals, carpels 1-many, seeds usually without albumen; sepals usually 5, often appearing double by a row of bractlets outside. A large family, sometimes broken up into the 3 sections indicated below.

A. Ovary superior.

Carpels 1-5, becoming a stone fruit; shrubs or trees. (*Drupaceæ*).

Flowers racemose, fruit blue 1. *Nuttallia*.

Flowers corymbose, fruit red 2. *Prunus*.

Carpels 1-many, not becoming a stone fruit. (*Rosaceæ*).

Carpels becoming clustered fleshy drupelets 3. *Rubus*.

Carpels heaped on a fleshy receptacle 4. *Fragaria*.

Carpels enclosed in an urn-like receptacle 5. *Rosa*.

Fruit otherwise, carpels becoming achenes or follicles.

Stamens 1-4.

Low herbs, leaves palmately lobed 6. *Alchemilla*.

Tall herbs, leaves pinnate 7. *Sanguisorba*.

Stamens 5 or more.

Shrubs.

Carpels becoming inflated, leaves broad, palmately 3-lobed 8. *Physocarpus*.

Carpels not inflated.

Fruit a single carpel, leaves 1.5 cm. long, or less,
palmately 3-lobed 9. *Purshia*.

Fruit of several-many carpels.

Flowers small, white or pink; fruit of follicles 10. *Spiræa*.

Flowers yellow, or if white 1 cm. or more broad; fruit
of achenes 11. *Potentilla*.

Herbs.

Style jointed or more or less plumose.

Petals 8, leaves tomentose beneath 13. *Dryas*.

Petals 5, leaves not tomentose beneath 14. *Geum*.

Style not jointed nor plumose.

Plants diœcious, leaves very large, compound 12. *Aruncus*.

Plants not diœcious.

Stamens 5, leaves 3-toothed 15. *Sibbaldia*.

Stamens more than 5.

Flowers densely spicate or capitate 7. *Sanguisorba*.

Flowers in racemes or corymbs.

Calyx with hooked bristles 16. *Agrimonia*.

Calyx without hooked bristles.

Fruit of achenes, sepals 4-12 mm. long 11. *Potentilla*.

Fruit of follicles, sepals 2-3 mm. long 10. *Spiræa*.

B. Ovary inferior, carpels 2-5, fruit fleshy; trees or shrubs. (*Pomaceæ*).

Branches thorny 17. *Cratægus*.

Branches not thorny.

Flowers in corymbs or cymes 18. *Pyrus*.

Flowers in racemes 19. *Amelanchier*.

1. NUTTALLIA (BIRD CHERRY)

Shrubs; leaves simple, entire, exstipulate; flowers polygamo-diœcious, the stamens of the fertile flowers imperfect; stamens 15, 5 inserted lower; carpels 5, superior; fruit a drupe with 1 nutlet. (Nuttall was an English botanist).

1. *N. cerasiformis* T. & G. Clumps 1-3 m. high; leaves broadly oblanceolate, acute or obtuse, 6-10 cm. long, pubescent beneath; flowers in drooping racemes, appearing with or before the leaves; petals white, twice as long as the calyx; fruit a blue, glaucous drupe, when half-ripe reddish-yellow on red pedicels. West of the Cascades.

2. PRUNUS (PLUM OR CHERRY)

Trees or shrubs with simple, serrate leaves; flowers white, calyx 5-cleft, the lobes deciduous; petals 5, stamens numerous, pistil solitary, stigma capitate; fruit a drupe. (The Latin name).

1. *P. demissa* Nutt. (CHOKE CHERRY). Flowers in racemes; shrubs or trees, 3 dm. to 10m. high; leaves ovate, oval or obovate, firm, short-acuminate, acute or obtuse, rounded or slightly cordate at base, very finely serrate,

petioles often with 2 glands; racemes 0.5-1 dm. long, densely flowered, the pedicels shorter or longer than the flowers; petals 3-6 mm. long; fruit red or purplish-black, sweet, not very astringent, 6-8 mm. thick. A low shrub at the Coast; a tree at Spence's Bridge.

2. *P. emarginata* Dougl. (WILD CHERRY). Flowers corymbose; shrub or tree, bark brown, marked with lenticels; leaves oblong-oval, pubescent beneath, mostly obtuse, glandular at the base of the blade; calyx-lobes reflexed, petals 4-5 mm. long, pubescent outside; drupe red, bitter. Coast to Rockies; Vancouver.

3. RUBUS (RASPBERRY, BLACKBERRY)

Erect or trailing, sometimes herbaceous, leaves simple or usually 3-foliate, stipulate; calyx 5-lobed, persistent without bractlets; petals 5, deciduous; stamens many; carpels usually many on a spongy or fleshy receptacle, becoming small drupes. (The Latin name, from *ruber*, red).

Stems unarmed.

Tall, shrubby, 6-15 dm. high, leaves very large 1. *R. parviflorus*.

Low, herbaceous.

Leaves round, slightly lobed; fruit yellow 2. *R. Chamæmoris*

Leaves cleft or divided; fruit usually red.

Stems and pedicels glandular-hispid; petals white 3. *R. transmontanus*.

Stems and pedicels not glandular-hispid.

Petals white.

Sepals 3-4 mm. long, pubescent 4. *R. pubescens*.

Sepals 6-9 mm. long, glabrous or pubescent.

Leaves 5-foliate, drupelets glabrous 5. *R. pedatus*.

Leaves simple or ternate, drupelets pubescent 6. *R. lasiococcus*.

Petals red.

Petals oblanceolate to obovate, 10-15 mm. long, clawed 7. *R. acaulis*.

Petals obovate, scarcely clawed, 10 mm. long or less 8. *R. arcticus*.

Stems armed with prickles or bristles.

Erect; drupelets readily separating from the spongy receptacle

(Raspberries).

Flowers red 9. *R. spectabilis*.

Flowers white.

Peduncles armed with a few hooked prickles, fruit purple 10. *R. leucodermis*.

Peduncles densely glandular-bristly, fruit red, sometimes yellow.

Leaves only slightly tomentose beneath when young becoming glabrate 11. *R. viburnifolia*.

Leaves usually densely white tomentose beneath 12. *R. strigosus*.

Trailing; drupelets not separating from the juicy receptacle (Blackberries).

Stems slender, fruit red 13. *R. nivalis*.

Stems stout, fruit black.

Leaves 3-foliate 14. *R. macropetalus*.

Leaves much dissected 15. *R. laciniatus*.

1. *R. parviflorus* Nutt. (THIMBLEBERRY). Shrub 6-20 dm. high, young branches glandular-hairy; bark exfoliating; leaves round-cordate, 5-7 lobed, 6-20 cm. wide, doubly serrate; flowers 4-6 cm. wide, petals white, rarely reddish; sepals ovate with an appendage nearly equaling the body, fruit red, hemispherical on a convex torus. (*R. nutkanus* Moc.) Coast to Rockies; Vancouver; Alaska.

2. *R. Chamæmoris* L. (CLOUDBERRY, BAKED APPLE). Erect, 0.5-1.5 dm. high, from creeping rootstocks; unarmed; leaves 2 or 3, round-reniform, cordate, 5-lobed, rugose; flowers solitary, dioecious; petals white, twice as long as the short-pointed, pubescent, glandular sepals; fruit yellow, separating from the dryish receptacle. Peat bogs, Atlantic to Pacific. Vancouver; Alaska.

3. *R. transmontanus* Focke. Herbaceous, creeping, slightly bristly or glandular-hispid; leaves ternate, stipules 1-1.5 cm. long, puberulent; petioles somewhat glandular-hispid; leaflets rhombic-ovate, 3-7 cm. long, acute at base and apex; flowers 1-3, pedicels glandular-hispid; sepals 4-5 mm. long, about as long as the white petals; fruit red, drupelets smaller

and less juicy than *R. pubescens*. Revelstoke. (Perhaps, Dr. Rydberg says, a hybrid between *R. pubescens* and some species of the *R. strigosus* group).

4. *R. pubescens* Raf. Stems unarmed, slender herbaceous or somewhat woody at base, ascending or trailing; leaves 3-5-foliate, pubescent, leaflets 2-6 cm. long, rhombic-ovate, acute at apex and often at base; stipules oblong, 5 mm. long; flowers 1-3, petals small, white or pink, hardly exceeding the pubescent or glandular-pubescent reflexed sepals; fruit red, not separating easily from the receptacle. (*R. triflorus* Rich.) Alaska southward, Golden; Armstrong.

5. *R. pedatus* Smith. Stems very slender, trailing, rooting at the nodes, plant glabrate except the petioles; leaves 3-foliate, or the lower so deeply lobed as to appear 5-foliate; leaflets 1-2 cm. long, obovate, stipules ovate, 3 mm. long; peduncles usually 1-flowered; petals white, oblong, shorter than the foliaceous, glabrous sepals; carpels glabrous; fruit 1-5-red glabrous drupelets, not separating easily from the receptacle. Common, woods. Alaska southward; Capilano Valley.

6. *R. lasiococcus* Gray. Stems slender, creeping, 1-5 dm. long, cinereous-pubescent; leaves usually ternate, 3-5-lobed, or sometimes 3-foliate, flowers solitary; petals white, obovate, hardly exceeding the calyx; carpels 5-12, densely tomentose; styles thickened upwards; fruit red or yellowish, drupelets 4-5 mm. broad, pubescent. To be looked for in the Cascades, southward.

7. *R. acaulis* Michx. Similar to the following; common southward; simple, 1 dm. high or less, leaves few, all leaflets rounded at apex; usually 1-flowered, petals a little longer than the sepals. Mts., Alaska to Wn.

8. *R. arcticus* L. Rootstock usually branching, stems with several leaves, 1-2 dm. high; leaves trifoliate, sparingly pubescent, some of them acute; flowers 1-3, sub-dioecious, petals scarcely clawed, 10 mm. long or less, about equaling the acuminate pubescent sepals, drupelets usually numerous, dark-red. Alaska southward in Rockies; Lake Louise.

9. *R. spectabilis* Pursh. (SALMONBERRY). Stems 2-4 m. high, perennial; bark brownish-yellow, exfoliating, prickles weak; the young shoots often quite unarmed; leaves trifoliate, the lower leaflets either unsymmetrical or lobed on the lower side, glabrous; stipules linear; flowers solitary, petals red, twice as long as the deltoid, cuspidate, pubescent sepals; carpels glabrous; fruit dark-red or yellow. West of the Cascades; northward to Alaska.

10. *R. leucodermis* Dougl. (BLACK R.) Stems tall, stout, glaucous, recurving and rooting at the tip; plentifully armed with stout prickles, those on the leaves and peduncles more recurving; leaves usually 3-foliate; leaflets tomentose beneath, the terminal long-petiolulate; flowers many, in corymbs; petals white, shorter than the reflexed pubescent long-acuminate sepals; pedicels spiny; carpels pubescent; fruit purple, glaucous. Alaska southward, west of the Selkirks.

R. leucodermis X *melanolasius*. With the habit and prickly stem of the former, but the upper part of the branches, the pedicels and petioles more or less glandular-hispid. Sicamous.

11. *R. viburnifolia* (Greene) Rydb. Stems densely soft-bristly, glabrous or puberulent; leaflets incised-serrate, on old shoots 3, on new often 5; the terminal leaflet rhombic-ovate to ovate; pedicels densely glandular-hispid and somewhat bristly, calyx sparingly tomentose and glandular-hispid, sepals lanceolate, caudate-acuminate; fruit 15 mm. broad, red or yellow, drupelets very numerous, comparatively small, pubescent. Selkirks and northw. This is doubtless the species at Crawford Bay, said to have yellow aromatic fruit.

12. *R. strigosus* Michx. Rough bristly (in *R. subarcticus* (Greene) Rydb., a northern form, densely and finely villous on stems, almost white-tomentose on young stems) leaves 3-5-foliate, doubly serrate, some often green

beneath, the terminal leaflet rounded at base, peduncles and pedicels bristly and more or less glandular; sepals ovate-lanceolate, acuminate, glandular and hispid, only slightly tomentose on the upper half without; fruit 1 cm. broad or less, light-red, acid or in *R. melanolasius* Focke, which Dr. Rydberg implies is the ordinary B. C. form, dark red, 10-12 mm. broad. *R. strigosus* occurs in the Cascades and northward to Alaska. The two species may be distinguished thus:

R. strigosus. Stems brownish, more or less bristly; leaves dark-green above, sepals lanceolate-ovate, acuminate; pedicels more or less glandular-hispid; fruit red.

R. melanolasius. Stems purple or yellow, densely bristly; leaves light-green above, sepals ovate, caudate-acuminate; pedicels densely glandular-hispid; fruit dark-red. We have, however, forms with light-red, small fruit, and densely glandular-hispid pedicels.

13. **R. nivalis** Dougl. Stems slender, trailing, 3-9 dm. long; prickles small, recurved; leaves slightly prickly beneath, shining, 3-lobed or sometimes 3-foliate; stipules ovate; flowers perfect, 1-few, petals narrowly lanceolate, white or purple, sepals lanceolate, pubescent, 6-8 mm. long, fruit red, pubescent. Comox; Rockies.

14. **R. macropetalus** Dougl. (TRAILING BLACKBERRY). Stems stout, trailing, 1-4 m. long; prickles short, reflexed; leaves pubescent, trifoliate, leaflets ovate, dentate, on the fruiting branches often simple and 3-lobed; flowers sub-dioecious in small cymes, the fertile small, petals white, 1 cm. long, the sterile with petals 2-2.5 cm. long; sepals ovate, cuspidate or appendaged, often lobed; fruit glabrous, black. Alaska to Cal. (*R. ursinus* is Californian) **R. macropetalus** X **viburnifolius** (apparently), with the bristly and glandular stem, pubescent fruit and strongly veined leaflets of the latter; but with the leaves and the fruits much longer, the sepals much longer and the terminal leaflet large and cordate; the tomentum or under surface of leaves slight. Along snowsheds, Glacier. **R. Helleri** Rydb. Slightly differing from *R. macropetalus* in the straight prickles and finely pilose fruit. West Coast.

15. **R. laciniatus** Willd. (EVERGREEN B.) Very stout with strong, hooked prickles; leaves palmately 3-5 foliate, the divisions pinnatifid; petals white or pinkish, often 3-lobed, sepals often 3-lobed, the middle lobe the largest in both; fruit black. A common garden escape; Lulu Is.

4. FRAGARIA (STRAWBERRY)

Stemless perennials with runners and trifoliate leaves; flowers white (sometimes red) cymose; bracts between the sepals; styles lateral; receptacle becoming fleshy, covered with achenes which are either superficial or in pits. (The name from the fragrance of fruit, or of the flowers of some species). A difficult genus with apparently more species in the books than are to be found in nature.

Pubescence of stems and petioles spreading or reflexed.

Leaves thin, light green, pubescent on both sides at flowering.

Leaves thick or firm, dark green, usually glabrous or glabrate above at flowering.

Leaves more or less glaucous above.

Leaflets thick, long-silky beneath; sepals lanceolate.

Leaflets, at least the terminal, petiolulate; achenes large, superficial

Leaflets nearly or quite sessile; achenes smaller in deeper pits.

Leaflets firm, not so silky beneath; achenes in shallow pits, sepals more broadly lanceolate

Leaves not glaucous; sepals ovate; fruit 2-3 cm. in diameter; achenes in shallow pits; petals $\frac{1}{2}$ longer than sepals

Pubescence of stems and petioles appressed or ascending, sometimes almost wanting; leaflets rather thin, sepals and bracts sub-equal.

1. *F. bracteata*.

2. *F. chiloënsis*.

3. *F. cuneifolia*.

4. *F. platypetala*.

5. *F. grandiflora*.

6. *F. glauca*.

1. **F. bracteata** Heller. Slender, rootstock not very stout; leaves thin, wrinkled or somewhat rugose, not glaucous, becoming glabrate above; leaflets rhombic-ovate subsessile or the terminal petiolate; peduncle usually equaling or exceeding the leaves, usually with a leafy bract; flowers not fragrant 1.5-2 cm. broad; petals entire or crenate often reddish; sepals ovate, acuminate or somewhat mucronate, longer than the lanceolate bracts, spreading, or sometimes erect, in fruit; fruit ovoid; achenes small not very deeply sunk in pits. (*F. Helleri* Holz.) the western representative of *F. vesca*. V. I. eastward to the Rockies; Vancouver; Armstrong. A white-fruited form reported from the mts. of V. I. probably belongs to this species.

2 **F. chiloënsis** (L) Duch. Stout, rootstock, short, erect, leaves thick, glabrous and usually glaucous above, long-silky to tomentose beneath; leaflets obovoid more or less cuneate at base, at least the terminal petiolulate, the terminal tooth small; pubescence of petioles and peduncles abundant, spreading or reflexed; peduncles decumbent or ascending, characteristically short, sometimes long, but not exceeding the leaves; sepals acuminate, ovate or lanceolate, a little longer than the oblanceolate bracts, enclosing the fruit; fruit often large, ovoid or obovoid, sweeter than that of *F. bracteata*, with which it often grows at the coast; achenes large, superficial. Common along the coast, Alaska southward, and perhaps sparingly east of the Coast Range. Var. **Scouleri**, Hook. Scape overtopping the leaves. Queen Charlotte Islands.

3. **F. cuneifolia** Nutt. Similar; flowers smaller; sepals lanceolate, acute; fruit more hairy, oblong to hemispherical, not so well-flavored; achenes smaller, in pits. Apparently not very common. Elgin and V. I.

4. **F. platypetala** Rydb. Rootstock large, leaves thick to firm, rather sparingly short-silky beneath, more or less petiolate; glaucous above, leaflets broadly obovate, 2-8 cm. long, petiolulate; petioles and peduncles lightly clothed with spreading hairs; peduncle erect, 3-20 cm. long; usually longer than in *chiloënsis*; flowers 15-25 mm. broad; sepals acute; lanceolate, bracts lanceolate, oblanceolate or oblong, both enclosing the hemispherical to obovoid fruit; achenes medium, in shallow pits. Alaska to Spokane; Sproat.

5. **F. grandiflora** Ehrh. Rootstock short; leaves firm, glabrous above, not glaucous, silky on the veins beneath; petioles 1-3 dm. long; leaflets 4-15 cm. long, broadly obovate, petiolulate, peduncle usually shorter than the leaves, flowers more than 2 cm. broad; sepals ovate acuminate about equaling the lanceolate bractlets; fruit 2-3 cm. in diameter; achenes in pits. Cultivated; but far from cultivation near Trail.

6. **F. glauca** (Wats.) Rydb. Rootstock short or long; petioles and peduncles at first appressed-silky, often becoming glabrate; leaves firm, thinnish, somewhat glaucous and nearly or quite glabrous above, sparingly short silky beneath; leaflets petiolate, obovate to oblong-obovate; runners slender, nearly glabrous; peduncles erect, rather slender, usually equaling the leaves, sepals triangular- or ovate-lanceolate, acute or short-acuminate; bracts oblong-lanceolate, acute, nearly as long; flowers not fragrant, 1.2-2 cm. broad; achenes in shallow pits. (*F. pauciflora* Rydb.) Common east of the Cascades and in the Rockies; Agassiz; Field; Fernie.

5. ROSA (Rose)

Shrubs with odd-pinnate leaves and usually prickly stems; stipules adnate to the petiole; calyx-tube (sometimes regarded as a hollow receptacle) urn-shaped, contracted at the mouth; petals and sepals 5, the latter often appendaged, stamens and carpels many, the latter hairy and becoming nutlets in fruit. (The Latin name).

Sepals deciduous in fruit.	
Prickles stout, recurved	1. <i>R. rubiginosa</i> .
Prickles weak, straight	2. <i>R. gymnocarpa</i> .
Sepals persistent in fruit.	
Flowers 2.5-4.5 cm. broad; usually in clusters, leaflets oblong-ovate, prickles straight	3. <i>R. pisocarpa</i> .
Flowers 3-5 cm. broad, mostly solitary, leaflets cuneate-obovate, not resinous and often glabrous beneath, prickles often recurved	4. <i>R. Woodsii</i> .
Flowers 5-8 cm. broad, mostly solitary.	
Prickles wanting.	
Leaflets not glandular-resinous beneath mostly cuneate at base	5. <i>R. blanda</i> .
Leaflets glandular or resinous beneath, mostly rounded at base.	6. <i>R. nutkana</i> .
Prickles present.	
Stems very densely prickly above	7. <i>R. Sayi</i> .
Stems not densely prickly above.	
Lateral leaflets rounded at base, usually resinous beneath, prickles usually plentiful, often dense at base.	6. <i>R. Nutkana</i> .
Lateral leaflets acute at base, not resinous; prickles few or none	5. <i>R. blanda</i> .

1. *R. rubiginosa* L. (SWEETBRIER). Stems stout, armed with strong, hooked prickles; leaf rachis prickly and very glandular; leaflets elliptical, rounded at base and apex, less than 2.5 cm. long, aromatic, doubly serrate; the short pedicels, and sometimes the receptacle, very hispid; sepals pinnatifid, hispid; flowers pink, 3-4 cm. broad, fruit obovoid. Introd.; well established at Victoria and New Westminster.

2. *R. gymnocarpa* Nutt. Stems slender, 3-20 dm. high, prickles straight, weak, rather dense throughout, or scattered or absent above; stipules broad or narrow, glandular, ciliate; leaf rachis glandular and more or less prickly, leaflets 5-9, round to elliptical, oblong or ovate, sessile or short petiolulate, 0.5-2.5 or even 3.5 cm. long, doubly serrate, usually glabrous beneath; flowers rose, rarely almost white, 1.5-2.5 cm. broad, in 1-few-flowered corymbs, pedicels hispid or glabrous; sepals soon deciduous; nutlets 9 or fewer; fruit depressed-globose, globose or obovoid, 5-7 mm. thick. Woods and rocky shores, V. I. to Montana. Forma *apiculata* (Greene). Fruit ovoid to ellipsoidal, often apiculate, nutlets often fewer (1-4); with the species. Forma *lanceolata*. Fruit lanceolate, sometimes falcate, 3 times as long as broad, nutlets few. Elgin.

2a. *R. gymnocarpa* X *R. nutkana*. Stems tall, rather slender, vigorous, densely reflexed-prickly below; prickles above slender but stiff; leaflets oval, rounded at apex, smooth or nearly so beneath, except on the midribs; flowers bright-pink, 4.5-5 cm. broad; stigmas pink, pollen scanty, sterile; maturing only a few, small fruits. Abundant locally at Crescent.

3. *R. pisocarpa* Gray. Stems not so stout as in *R. nutkana*, 1-2 m. high, armed with straight, rather strong, infrastipular prickles; or sometimes naked, leaflets 5-9, oblong to oblong-ovate, or obovate, slightly petiolulate, rounded or sometimes acute at base, pubescent and slightly resinous beneath, usually simply and sharply serrate; the leaf-rachis slightly pubescent, sometimes with a few prickles; flowers 2.5-3.5 cm. broad, solitary or usually in clusters; pedicels glabrous, rather slender, sepals with linear to lanceolate appendages, slightly or not at all glandular hispid; fruit 6-9 mm. in diameter, sub-globose, little if at all necked, varying to ovoid with a distinct neck, or ellipsoidal. V. I. to the Rockies; flowering at the Coast late in June, much later than *R. nutkana*. The globose and the ovoid fruiting forms are apparently distinct.

4. *R. Woodsii* Lindl. Stems usually low, 2-10 dm. high; prickles slender, short, varying in size, straight or recurved, sometimes scattered; stipules narrow or dilated, entire or toothed, usually eglandular, leaflets 5-9, small or large, cuneate-obovate, entire towards the base, sharply simply serrate above; obtuse or acute; glabrous or pubescent beneath; the rachis slightly or not at all prickly, glabrous or pubescent, the outer sepals usually with narrow lateral lobes; flowers solitary or in small clusters of 2-4, about 4 cm. broad,

on short, slender pedicels; fruit globose or ovoid, less than 1 cm. in diameter, with or without a short neck. (*R. Fendleri*, *R. Macounii*). Common in Alberta and Montana, and extending into eastern B. C.

5. **R. blanda** Ait. Stems 3-15 dm. high, unarmed or occasionally covered with numerous prickles; stipules dilated, naked and entire or slightly glandular-toothed, leaf rachis pubescent, not prickly; leaflets 5-7, oblong-lanceolate, thinnish, cuneate at base and petiolulate, simply serrate, not resinous; flowers large, solitary or few in small corymbs, sepals hispid, entire, appendaged erect in fruit; fruit globose or pyriform. Not common; reported from Beaver-mouth, Columbia Valley.

6. **R. nutkana** Presl. Stems stout, 3 dm.-3 m. high; prickles straight or recurved, broadly triangular to lanceolate, in pairs or in clusters; the stems often densely clothed below with weak, sometimes retrorse prickles; stipules glandular, leaf-rachis glandular and usually prickly; leaflets 5-9, ovate to elliptical-oblong, usually rounded at the base, acute or obtuse at apex, pubescent and thickly resinous-dotted beneath, doubly serrate; flowers 4-8 cm. broad, solitary or in 2's or 3's; pedicels stout, glandular or naked; calyx-lobes usually glandular, entire, rarely 2 of them lobed, the appendages linear and short to lanceolate and long, sometimes rather broadly foliaceous; fruit typically globose and neckless, but very variable: (a) globose and short-necked, maturing 25 nutlets or more (b) napiform, much broader than long, sometimes maturing 75 nutlets (c) pyriform, acutish at base, neck short or none or sometimes 3-4 mm. long, maturing usually fewer than 25 nutlets (d) deltoïd-cordate (e) oblong with few nutlets. These various fruiting forms are all found at the coast and very frequently give character to clumps. The species extends from V. I. to the Selkirks. Forms with leaves simply serrate and nearly or quite eglandular, and often glabrous, may be assigned to **R. melina** Greene. Var. **hispida** Fer. Fruit hispid. Elgin. V.I.; Spence's Bridge.

7. **R. Sayi** Schw. Stems 3-10 dm. high, usually covered more or less densely with straight prickles or bristles; infra-stipular prickles absent, or, if present, not enlarged (prickles somewhat uniform); stipules usually dilated, glandular; leaf-rachis somewhat villous or tomentose, not prickly, leaflets oblong-elliptical usually 5-7, pubescent, usually resinous beneath, doubly or simply serrate, mostly sessile and rounded at base; flowers solitary or in 2's or 3's, 4-7 cm. broad; pedicels smooth; sepals entire or 2 of them with small, linear lobes, not hispid or glandular-hispid on the margin; fruit globose or ellipsoidal to pyriform with a neck, 8-12 in diameter. Rocky Mountain region, Golden, etc. Dr. Rydberg distinguishes *R. Sayi* and *R. Engelmannii* S. Wats.:

Leaflets rather firm, coarsely serrate, fruit spherical or nearly so.	R. Sayi.
Leaflets thin, coarsely serrate, fruit oblong-ellipsoidal	R. Engelmannii

The two forms as they occur together at Golden are with difficulty distinguished, except by the shape of the fruit.

6. **ALCHEMILLA** (LADY'S MANTLE)

Low herbs; leaves palmately lobed or divided, with clasping stipules; flowers small, greenish; calyx-tube inversely conical, contracted at the throat, limb 4-parted, petals none; stamens 1-4, carpels 1-4, the style arising from near the base. (An Arabic name).

1. **A. macrosepala** Rydb. Annual, 2-10 cm. high; leaves 3-parted, the lobes 2-3 cleft; flowers in small cymes opposite the axils, enclosed by the broad stipules, stamen usually 1; sepals nearly half as long as the pilose tube. Sandy, grassy places, common at the Coast. (The native form of *A. arvensis*).

7. SANGUISORBA (BURNET)

Herbs with pinnate leaves, and small flowers in dense spikes at the ends of long, naked peduncles; calyx constricted at throat, the lobes 4, petal-like; petals none; stamens 4-12 or more; carpels 1-3, the terminal style with a brush-like stigma. (Latin *sanguis*, blood, *sorbere*, to absorb). POTERIUM.

Leaflets sessile.

Leaflets pinnatifid 1. *S. annua*.

Leaflets toothed 2. *S. minor*.

Leaflets petioled.

Filaments short 3. *S. microcephala*.

Filaments long 4. *S. sitchensis*.

1. *S. annua* Nutt. Slender, glabrous, 1.5-5 dm. tall, annual; leaflets 7-13, ovate to oblong, 8-15 mm. long; deeply pinnatifid, the segments narrowly oblong, and entire; flowers greenish-white in oblong heads; stamens 2-4, much shorter than the calyx, which in fruit has narrow wings. (*S. occidentalis*). Victoria, and southern B.C.

2. *S. minor* Scop. Slender, glabrous or pubescent, perennial; leaflets 7-19, ovate, deeply serrate, 8-15 mm. long; flowers greenish, in globose heads; stamens many, 12 or more, long-exserted, the upper flowers pistillate only. (*Poterium sanguisorba*). Spence's Bridge. Introd.

3. *S. microcephala* Presl. Tall, glabrous, perennial; leaflets about 11, oblong, cordate, obtuse, serrate with gland-tipped teeth, the upper 3-6 cm. long, the lower smaller, petioles 1-2 cm. long, flowers purple in globose or cylindrical heads; stamens 4, not exserted, the filaments not flat. Alaska southward. Masset, V. I.

4. *S. sitchensis* Meyer. Stout, 6-12 dm. high, perennial; leaflets 13-21, oblong to ovate, coarsely serrate, cordate, their petioles 0.5-2.5 cm. long; flowers whitish or greenish, in dense at first lanceolate, but finally cylindrical spikes, 3-10 cm. long; stamens 4, exserted, filaments flat. Wet places, Alaska southward to Wn. Forms with oblong, obtuse spikes and dark-purple calyx are referred to *S. Menziesii* Rydb. Same range.

8. PHYSOCARPUS (NINE BARK)

Shrubs with palmately lobed leaves and umbel-like flower-clusters; carpels 1-5, inflated, seeds roundish, shining, albuminous. (NEILLIA).

1. *P. opulifolius* (L.) Maxim. Clumps, 2-4 m. high; branches long, bark exfoliating; leaves ovate, 3-lobed, sub-cordate, or rounded at base, puberulent, stellately so beneath; flowers very numerous, the pedicels stellate-tomentose, petals round, white, often toothed, pods usually 3, glabrous, red, much exceeding the calyx. Atlantic to Pacific. Vancouver. *P. pauciflorus* (T. & A.) Pods glabrous, not exceeding the calyx. B. C. to Utah.

9. PURSHIA (ANTELOPE BUSH)

Diffusely branching shrubs, with small, solitary flowers; leaves fascicled; calyx bractless, petals 5, stamens many, carpels 1-2, free, pubescent, style long. (Pursh was an English botanist).

1. *P. tridentata* D.C. Pubescent, 6-18 dm. high; leaves 3-lobed at apex, tapering to a short petiole, 10-12 mm. long, including the petiole, tomentose beneath; petals yellow, clawed, 6 mm. long, sepals tomentose, obtuse, fruit a single 1-seeded beaked follicle, 1 cm. long. Dry hills, Kootenay; Cranbrook.

10. SPIRÆA

Shrubby, at least at base; leaves simple; flowers small, in racemes, panicles or corymbs; calyx 5-cleft, persistent; follicles 5-8, mostly more than 2-seeded, not inflated; stamens 20 or more, petals roundish; seeds linear, without albumen. (Greek *speiro*, I twist, in allusion to the pods of some species).

- Stamens united at base; plant hardly 1 dm. high; leaves cleft . . . 1. *S. pectinata*
 Stamens distinct; plants taller.
 Stamen-disk free at edge; carpels glabrous; dehiscent plants 0.5-2 m. high; leaves not cleft.
 Inflorescence cylindrical or pyramidal.
 Leaves 1-2 cm. broad, inflorescence dense . . . 2. *S. Douglasii*.
 Leaves 2-4 cm. broad, inflorescence loose . . . 5. *S. pyramidata*.
 Inflorescence flat- or round-topped.
 Flowers red, in small, dense clusters . . . 3. *S. densiflora*.
 Flowers white, in a large, loose cluster . . . 4. *S. lucida*.
 Stamen-disk adherent at the edge; carpels pubescent, indehiscent; plants 1-5 m. high . . . 6. *S. discolor*.

1. *S. pectinata* T. & G. Stem hardly 1 dm. high, pubescent, tufted, suffrutescent; leaves palmately 3-lobed, the divisions lobed, contracting to a broad petiole; flowers in a terminal spike; petals white; stamens united at base, perigynous; follicles 4-seeded. Mt. summits. Grouse Mt. Vancouver; Alaska.

2. *S. Douglasii* Hook. (HARDHACK). Pubescent, in dense clumps, 1-2.5 m. high; leaves oblong, 3-6 cm. long, serrate towards the usually obtuse apex, tomentose beneath; flowers red, crowded in a dense cylindrical, or narrowly pyramidal panicle; calyx-lobes reflexed, carpels glabrous. Common, Coast. Forma *alba*. Flowers white. Victoria (Dr. C. F. Newcombe). Var. *Menziesii* Presl. Leaves green beneath, pubescent, but not tomentose. Coast, not so common.

3. *S. densiflora* Nutt. (MT. SPIRÆA). Glabrous, except the calyx-lobes, branching, shrubby, 3-9 dm. high; leaves 1-2 cm. long, elliptical, obtuse, crenate towards the apex; flowers rose, in numerous small, dense clusters terminating the branches. Mts. "The Lions" Vancouver; Mt. Cheam.

4. *S. lucida* Dougl. Glabrous; stems usually simple, 3-5 dm. high, suffrutescent; middle and upper leaves 4-8 cm. long, oval-oblong, regularly or irregularly serrate towards the apex, or entire, glaucous beneath; flowers white or whitish, in a flat corymb; calyx-lobes pubescent. Common east of the Cascades.

5. *S. pyramidata* Greene. Similar; the inflorescence and branches puberulent; flowers white or rose, in a pyramidal cluster Revelstoke.

6. *S. discolor* Pursh. (OCEAN SPRAY). Shrub, 1-5 m. high, with pubescent twigs; leaves ovate, cuneate or truncate at base, coarsely toothed or lobed, tomentose beneath; flowers white in a large, ovoid panicle, petals oblong, not much longer than the whitish calyx; stamen-disk adherent at edge to the calyx, follicles pubescent; ovules 2, seed 1. (*Schizonotus*, *Holdiscus*) Rocky places and banks. Coast to Columbia Valley; Vancouver.

11. POTENTILLA (CINQUEFOIL, FIVE-FINGER)

Herbs, or rarely shrubs, with compound leaves and cymose flowers; calyx deeply 5-cleft, with 5 bractlets and thus appearing 10 cleft; petals 5, stamens many, achenes many on the dry receptacle; styles terminal or lateral. (Latin *potens*, powerful, in allusion to the medicinal properties of some species).

- Petals purple . . . 1. *P. palustris*.
 Petals yellow or cream.
 Stems shrubby . . . 2. *P. fruticosa*.
 Stems herbaceous.
 Flowers solitary on long scapes . . . 3. *P. Anserina*.
 Flowers cymose.
 Styles fusiform, attached near the base of the ovary, basal leaves pinnate. (*Drymocallis* Rydb.)

- Petals yellow.
 Petals about equaling the calyx or shorter.
 Sepals mucronate, petals oval 4. *P. oregana*.
 Sepals acute, petals obovate 5. *P. glandulosa*.
 Petals much exceeding the calyx 6. *P. valida*.
 Petals creamy or white, scarcely longer than sepals 7. *P. corymbosa*.
 Styles terminal, filiform or glandular, thickened towards the base.
 Cymes leafy; annuals, biennial or short-lived perennials; style glandular-thickened at base.
 Leaflets pinnate below in 2 pairs, ternate above 8. *P. rivalis*.
 Leaflets ternate.
 Inflorescence broad, leaflets oblanceolate 9. *P. millegrana*.
 Inflorescence close or narrow; leaflets obovate.
 Rough-pubescent; calyx 6-8 mm. long 10. *P. monspeliensis*.
 Soft-pubescent; calyx 4-6 mm. long 11. *P. biennis*.
 Cymes not very leafy, perennials with strong rootstocks, styles mostly filiform.
 Leaves digitately divided.
 Basal leaves 5-9 foliate.
 Leaves tomentose beneath.
 Plants 0.5-1.5 dm. high 12. *P. nivea* var.
 Plants 3-8 dm. high.
 Leaflets toothed 13. *P. gracilis*.
 Leaflets pinnatifid 14. *P. flabelliformis*.
 Leaves not tomentose beneath.
 Plants usually 1-3 dm. high 15. *P. dissecta*.
 Plants usually 4-8 dm. high 16. *P. Nutallii*.
 Leaves 3-foliate; alpine.
 Leaves tomentose on both surfaces 17. *P. villosa*.
 Leaves tomentose beneath, villous above.
 Stems scapose 18. *P. uniflora*.
 Stems leafy 12. *P. nivea*.
 Leaves glabrous or nearly so 19. *P. flabellifolia*.
 Leaves pinnately divided.
 Cyme dense, petals equalling the sepals, style thickened at base 20. *P. Pennsylvanica*.
 Cyme open, petals longer than sepals, style not thickened at base.
 Leaflets tomentose beneath 21. *P. Hippiana*.
 Leaflets silky beneath.
 Leaflets dissected 22. *P. ovina*.
 Leaflets deeply serrate 23. *P. Drummondii*.

1. *P. palustris* (L.) Scop. (MARSH CINQUEFOIL). Stems decumbent, stout, 3-6 dm. long; leaves pinnate, leaflets 5-7, serrate, oblong; flowers few, cymose; petals shorter than the purplish calyx; style lateral; achenes glabrous. Bogs and margins of lakes; Pacific to Atlantic; Alaska.

2. *P. fruticosa* L. (SHRUBBY C.) Erect, 1-10 dm. high, leaves pinnate; leaflets 5-7, oblong-lanceolate, entire, revolute, tomentose beneath; petals longer than the sepals; style lateral. Dry soil Alaska, southw.; Kootenay; Mt. Cheam.

3. *P. Anserina* L. (SILVER WEED). Spreading by runners; leaves all radical with cleft or entire stipules; leaflets numerous with small ones interposed, oblong, serrate, green above, silvery beneath; petals large; style filiform, lateral; achenes corky with a groove. Marshes and saline places Atlantic to Pacific; Alaska. Var. *concolor* Ser. Leaflets silky above. Vancouver; Rockies. *P. pacifica* How. Achenes not corky, not grooved. Coast marshes.

4. *P. oregana* Nutt. Stem 6-7 dm. high, stem and petioles densely villous, with long yellowish hairs; basal-leaves with about 9 leaflets, rather densely pubescent on both sides, cyme open, the pedicels 1-2 cm. long at flowering; bractlets oblong-lanceolate, 4-5 mm. long; sepals ovate, mucronate, 5-6 mm. long at flowering; petals yellow, 5-7 mm. long, oval. MacKenzie and B. C. to Idaho.

5. *P. glandulosa* (Lindl.) Rydb. Glandular-pubescent, with white hairs, branching above, 3-6 dm. high; basal leaflets 5-9, glabrate on the upper surface, obovate, simply or doubly serrate with rather broad teeth; cyme finally open, many flowered; bractlets narrow, much shorter than the sepals;

petals yellow, obovate, not longer than, or about equaling the sepals; corolla 10-15 mm. broad; achenes smooth with a dorsal line; calyx-tube 6-7 mm. broad in fruit. V. I. to Kamloops and Rossland.

6. *P. valida* Greene. Stout, simple, erect, glandular-pubescent, 3-9 dm. high; basal leaflets 7-11 obovate, the terminal cuneate, coarsely usually simply serrate; inflorescence finally open, forming an almost flat-topped cyme, 1-2 dm. broad; bractlets $\frac{2}{3}$ as long as the pointed sepals; petals yellow, rounded, large, 6-10 mm. long, flowers 15-22 mm. broad; achenes smooth, distinctly carinate on the back above the middle, and veined. Victoria and interior (probably) as the plant occurs in Idaho. (*P. arguta* Nutt., not Pursh.)

7. *P. corymbosa* Rydb. Stem 3-8 dm. high, glandular-pubescent; leaflets of basal leaves 7-11, sparingly short-hairy and glandular-tomentose, coarsely and deeply doubly serrate with ovate teeth, stipules toothed; inflorescence usually flat, bractlets nearly equaling the acute sepals at flowering, petals white, broadly obovate, 5-6 mm. long, stamens about 25. Kootenay.

8. *P. rivalis* Nutt. Erect, 2-5 dm. high, branching above, villous; basal leaves 3-5-foliolate, the cauline ternate; leaflets ovate to oblong-cuneate, incisely coarsely serrate, green on both sides, villous or glabrate; cyme open, broad; petals shorter than the sepals which exceed the bracts. Kootenay.

9. *P. millegrana* Engelm. Similar to the next; divaricately branching; a flower in each fork; leaflets oblong-cuneate or oblanceolate; calyx 6-8 mm. long, petals about half as long, sepals and bracts subequal; stamens about 10; achenes often whitish. Kootenay; occasionally in grain fields, Fraser Delta, where it grows very tall.

10. *P. monspeliensis* L. Stout, hirsute, 2-7 dm. high; leaflets obovate to oblanceolate, the upper toothed nearly to the base; cymes close, calyx large, petals not exceeding the sepals; stamens 15-20; achenes brown, wrinkled. Introd. about towns, and also native; Alaska southw.

11. *P. biennis* Greene. Usually slender, soft-pubescent, more or less glandular, simple or branching, 2-5 dm. high; leaflets obovate to oblanceolate, toothed or incisely lobed with broad mucronate teeth; flowers small on pedicels 4-20 mm. long; petals $\frac{1}{2}$ - $\frac{2}{3}$ as long as the calyx; inflorescence narrow, the cymes arranged somewhat racemously along the stem; stamens about 10, achenes often whitish. Along streams V. I. to Rockies.

12. *P. nivea* L. Stems 0.5-1.5 dm. high, tufted, silky-villous; leaves 3-foliolate, leaflets obovate, coarsely dentate, tomentose beneath, green but villous above; flowers 1-5, the obovate, emarginate petals little longer than the white-villous sepals. Alpine; Rockies. Var. *pentaphylla* Lehm. Leaflets mostly 5, deeply oblong-toothed, the middle one more or less stalked. (*P. quinquefolia* Rydb.) Rockies; Crow's Nest Pass; Alaska.

13. *P. gracilis* Dougl. Similar to *P. Nuttallii*. Stems silky villous; leaflets densely white-tomentose beneath, teeth of leaflets less than half the distance to the midrib; stipules ovate, often toothed; calyx silky, bractless, small; cyme broad, petals much longer than the sepals. Dry fields, Victoria and D. I.; Spence's Bridge.

14. *P. flabelliformis* Lehm. Stem 4-6 dm. high; leaflets of basal leaves usually 7, the lowest smaller, green, appressed-silky to glabrate above, white tomentose beneath; leaflets deeply cleft into linear or oblong, more or less revolute divisions; petals much longer than the sepals. Kootenay; Bonnington Falls. *P. Blaschkeana* Turcz. Taller and stouter with larger flowers, intermediate between this species and *P. gracilis*. Bonnington Falls.

15. *P. dissecta* Pursh. Stems usually several, 1-3 dm. high; basal leaves 5-7-foliolate, sometimes slightly pinnate, the leaflets obovate-oblong, coarsely toothed, silky strigose, stem leaves few, reduced; cyme open few- to several-flowered; petals obovate, truncate or retuse, almost twice as long as the sepals,

which are nearly twice as long as the bracts. Mts., Cascades to Rockies. Var. *glaucophylla* Wats. Leaves glaucous-green, glabrate or glabrous above, lightly silky beneath. Same range; Mt. Cheam. Var. *multisecta* Wats. More hairy than the species; leaflets with linear-oblong divisions. (*P. multisecta* Rydb.) Rocky ledges, Rockies; Bonnington Falls.

16. *P. Nuttallii* Lehm. Stems stout, sparsely hirsute, 3-8 dm. high; stipules lanceolate; basal leaves about 7-foliate, green and sparingly hirsute, the leaflets oblanceolate, toothed, sometimes deeply, the calyx and under surface of the leaves more or less glandular-atomiferous; cyme open, many-flowered; petals obcordate, hardly longer than the hirsute sepals. (*P. gracilis rigida* Wats.) Moist prairies, Okanagan to Alberta.

17. *P. villosa* Pall. Densely silky villous throughout, the leaves slightly green on the upper surface, 1-3 dm. high from a thick coudeux; leaflets cuneate-obovate, dentate; flowers 1-few; petals much exceeding the sepals; achenes rounded on back. Alpine; Cascades; Mt. Cheam, Rockies; Alaska.

18. *P. uniflora* Ledeb. Stems tufted, a few cm. high; leaves mostly basal, all 3-foliate, tomentose beneath, leaflets cuneate-obovate, with coarse teeth; flowers usually solitary on scapose stems, the obcordate petals about twice as long as the grayish-villous sepals. Arctic, southward in Rockies.

19. *P. flabellifolia* Hook. Nearly glabrous, 2-3 dm. high; leaflets cuneate-obovate, with long, oblong teeth, the terminal leaflets usually petioled; flowers few, petals obcordate, much exceeding the villous sepals, which equal the oblong bracts; achenes margined on the back. Alpine, Cascades; Mt. Cheam.

20. *P. pennsylvanica* L. var. *strigosa* Pursh. Stems several, 1.5-3 dm. high, silky-pubescent; leaflets 5-10, pinnatifid, the segments revolute-margined, grayish beneath, greener above; flowers in dense cymes; petals hardly longer than the subequal sepals and bracts; style thickened at base. Columbia Valley; Golden.

21. *P. Hippiana* Lehm. Densely white-silky throughout; stems tufted, 2-4 dm. high; leaflets 5-7, nearly equally white on both sides, cuneate-oblong, incisely toothed; flowers in a short, open cyme; bracts nearly as long as the sepals; petals retuse, obovate, a little longer than the sepals. Banff to Wn.; Cache Creek; Crow's Nest Pass.

22. *P. ovina* J. M. Macoun. Low, tufted, 1-1.5 dm. high; leaflets 9-11, deeply 2-3-parted, hoary when young, finally villous on both faces; flowering stems scarcely leafy; flowers on slender pedicels, 2.5-5 cm. long, petals $\frac{1}{3}$ longer than the sepals; achenes few, brown, smooth. Sheep Mt.; Banff.

23. *P. Drummondii* Lehm. Tufted, 3-5 dm. high, finely appressed-pubescent; leaflets 3-11, cuneate at base, 15-35 mm. long, incisely 8-10-lobed; flowers on long, slender pedicels; the petals twice as long as the stiffly hairy calyx; achenes smooth, brown; merging into the slightly pinnate forms of *P. dissecta*. Mt. Meadows, Rockies to Cascades.

12. ARUNCUS (GOAT'S BEARD)

Herbaceous, leaves 2-3-pinnate; dioecious; carpels 3-4; flowers sessile or nearly so, on the long spike-like branches of the large panicle; the fertile flowers reflexed in fruit; petals narrow, white. (A word used by Pliny to designate the beard of a goat).

1. *A. sylvester* Kost. Tall, 1-2 dm. high; leaves large, green on both sides, pubescent beneath, slightly so above, leaflets sharply doubly-serrate, acuminate. Rich banks; common. Alaska to Atlantic; Vancouver.

13. DRYAS (ALPINE AVENS)

Low, matted herbs, slightly woody at base, with simple, rugose, revolute leaves, tomentose beneath; flowers solitary on scapes, petals and sepals about 8; carpels and stamens many; receptacle dry; styles plumose. (Greek *dryas*, a wood-nymph).

1. *D. octopetala* L. Low tufts, hardly 1 dm. high; leaves oblong, crenate, the blade 1-1.5 cm. long, 4-5 mm. wide, rounded or cordate at base; flowers 2 cm. broad, scape white-tomentose; petals white, a little longer than the oblong white-tomentose calyx-lobes; styles becoming long, plumose. Mts.; Golden; Alaska.

2. *D. integrifolia* Vahl. Similar; leaves ovate or ovate-lanceolate, obtuse or subcordate at base, entire or with 1-2 teeth near the base; flowers slightly smaller, sepals linear. Alaska southward in Rockies; Lake Louise.

3. *D. Drummondii* Rich. Low, the white-tomentose scapes 0.5-2.5 dm. high; leaves oval or oblong, crenate-dentate, the blades 1.5-3 cm. long, 8-10 mm. wide, mostly narrow at the base; flowers 2.5 cm. broad; petals yellow, twice as long as the black-tomentose ovate sepals. Rockies, Golden. *D. tomentosa* Farr. is distinguished from this species by its densely white-tomentose calyx. Pass, Emerald Lake, to Yoho Valley.

14. GEUM (AVENS)

Perennial herbs with pinnate basal leaves; calyx usually with 5 bractlets in the sinuses; petals 5, stamens many; carpels many, on a conical, dry receptacle with persistent straight or jointed styles. (An old name. Greek, *geuein* to taste well; in allusion to some edible root).

Styles jointed (*Geum propter*).

Petals yellow, calyx and lobes reflexed.

Terminal leaflet of basal leaves cordate. 1. *G. macrophyllum*.

Terminal leaflet of basal leaves cuneate 2. *G. strictum*.

Petals purplish, calyx-lobes not reflexed 3. *G. rivale*

Styles not jointed, calyx-lobes erect. (*Sieversia*).

Style glabrous. 6. *G. Rossii*.

Style plumose.

Calyx purple, its bractlets long 5. *G. triflorum*.

Calyx green, its bractlets short 4. *G. calthifolium*.

1. *G. macrophyllum* Willd. (LARGE-LEAVED YELLOW A.) Hirsute, 3-6 dm. high; basal leaves interruptedly pinnate with a large terminal cordate crenate-dentate leaflet; the lateral leaflets of the ample stem leaves 2-4, small rounded or wanting; stipules large, the lobes of the terminal wedge-shaped, rounded at apex, receptacle slightly hairy; petals 4-7 mm. long, spreading, not clawed, the upper joint of the style glabrous or slightly hairy, the lower 4-5 mm. long, glandular; achenes hooked. Common Alaska to Cal. *G. oregonense* (Scheutz) Rydb. Very similar, upper stem-leaves smaller, flowers more numerous, on longer peduncles, petals 4-5 mm. long, lower joint of style 6 mm. long. V. I. eastward.

2. *G. strictum* Ait. (YELLOW A.) Similar; 6-10 dm. high, the terminal and lateral leaflets of the basal leaves cuneate at base, incised; leaflets of the stem leaves 3-5, acute, receptacle downy; upper joint of style hairy, the lower glabrous. East of Cascades. *G. rivale* X *strictum* (*G. aurantiacum* Fries.) Habit and basal leaves of *G. rivale*, petals golden-yellow, clawed at base, longer than the reflexed sepals. Alberta to eastern B. C.

3. *G. rivale* L. (PURPLE A.) About 6 dm. high; basal leaves lyrate and interruptedly pinnate; stem leaves few, 3-foliate or 3-lobed; flowers nodding, petals erect, clawed; sepals erect or spreading, contracted to a claw, purplish-orange; the upper joint of the style short plumose. Wet meadows, Kootenay; Okanagan.

4. *G. calthifolium* Menzies. Hirsute, slender, 1-3 dm. high; basal leaves with a large round-cordate, slightly lobed, crenate, terminal leaflet, the lateral leaflets few and small, stem leaves ovate, cordate, few; flowers 1-few, petals yellow, rounded or emarginate, 8-14 mm. long; sepals erect, bractlets small, styles plumose for $\frac{3}{4}$ of their length, becoming 1.3-2 cm. long, not jointed. Coast Mts., "The Lions"; Alaska.

5. **G. triflorum** Pursh. (PLUMED A.) Pubescent, 2-5 dm. high; basal leaves apparently much dissected, really interruptedly pinnate, the leaflets many-toothed and incised, stem-leaves few, small; flowers cymose (often 3) on long peduncles; bractlets linear, longer than the purple erect calyx; petals creamy or purple-tinged, about equaling the sepals; styles plumose, becoming 2.5-3 cm. long. (*G. ciliatum*). East of the Cascades; Lytton; Peace River.

6. **G. Rossii** Ser. Puberulent or glabrate below, deeply cleft; petals yellow, 1 cm. long, style about 4 mm. long. **G. humilis** (R. Br.) Rydb. More or less silky-hirsute, leaves toothed or lobed. Both Alaskan; perhaps in northern B. C.

15 SIBBALDIA

Low perennials; calyx 5-parted with 5 bractlets; petals 5, minute; stamens 5, alternate with the petals on a woolly disk; achenes 5-10, styles lateral. (Sibbald was a Scotch botanist).

1. **S. procumbens** L. Pubescent; leaflets 3, cuneate-obovate, 3-toothed at apex, petals yellow, caducous. Mts. throughout; Alaska.

16. AGRIMONIA (AGRIMONY)

Tall, perennial herbs; leaves interruptedly pinnate; flowers in terminal racemes; the top of the calyx-tube beset with hooked bristles; petals 5, yellow; stamens 5-15; styles terminal, achenes 2. (Greek *agros*, a field, *monos*, alone; chief of the field; in allusion to medicinal properties).

1. **A. gryposepala** Walls. Leaflets large, smoothish above, more or less hirsute and glandular-atomiferous beneath; fruiting calyx hardly 1 cm. long; outer hooks in fruit recurved; rachis of inflorescence minutely glandular and with long, spreading hairs. Introd. Agassiz, Revelstoke.

2. **A. striata** Michx. Leaflets large, smoothish above, glandular-atomiferous and more or less pubescent beneath; rachis of inflorescence appressed-villous or glandular-puberulent without widely spreading hairs; hooks in fruit erect or scarcely spreading, fruiting calyx deflexed. Eastern B. C. to Alberta, and eastward.

17. CRATÆGUS (HAWTHORN)

Thorny shrubs or small trees; leaves simple; flowers white, in corymbs; sepals and petals 5; stamens 5-20, carpels 2-5, the ovary inferior; fruit drupe-like, containing 1-5 nutlets, and crowned by the persistent calyx. (Greek *kratos*, strength, in allusion to the tough wood).

1. **C. brevispina** (Dougl.) Heller. (BLACK H.) A small tree or shrub, leaves glabrous or slightly pubescent above, ovate or elliptical-obovate, serrate, or somewhat lobed, sometimes glandular at base and on the petioles; spines moderately stout, somewhat curved, 2-4 cm. long; corymbs few-many-flowered, glabrous or pubescent; petals crenate at apex, stamens 10, styles 5, fruit black. (*C. Douglasii* Lindl.) Victoria; Fraser Valley; Kootenay.

2. **C. columbiana** Howell. Shrub or small tree, spines 3-6 cm. long; leaves cuneate-obovate, with 5-9 short lobes above the middle, acutish, sparingly pubescent to glabrate, corymbs rather many-flowered, sparingly pubescent or glabrate, calyx-lobes triangular, acute, often serrate, fruit scarlet. East of Cascades. Var. **Piperi** (Brit.) Calyx and fruit pubescent. Kamloops.

18. PYRUS (APPLE, PEAR)

Trees or shrubs, leaves simple or compound; flowers in clusters; petals round-ovate, rather showy, exceeding the 5-lobed calyx; stamens many; styles 2-5; fruit a pome, the 2-5 cells with cartilaginous walls, embedded in the flesh. (The Latin name for the pear).

Leaves simple.

Fruit globose, petals large	: : : : : : : : :	1. <i>P. malus</i> .
Fruit oblong, petals small	: : : : : : : : :	2. <i>P. diversifolia</i> .
Leaves odd-pinnate.		
Leaves pubescent, leaflets many.	3. <i>P. Aucuparia</i> .
Leaves glabrous, leaflets 7-15.		
Leaves dull, serrate at apex	4. <i>P. occidentalis</i> .
Leaves shining, serrate from near the base	5. <i>P. sitchensis</i> .

1. ***P. malus* L. (APPLE).** Leaves ovate, rounded or cordate at base, serrate, more or less tomentose beneath to glabrate; calyx-lobes tomentose, persistent in fruit; petals large, pinkish. Cultivated, often spontaneous.

2. ***P. diversifolia* Bong. (CRAB APPLE).** Tree 5-10 m. high; young leaves pubescent, becoming glabrate; leaves ovate, often 3-lobed, serrate, acute or obtuse; flowers corymbose, petals white, about 1 cm. long, calyx tomentose, not persistent in fruit; fruit oblong, about 1 cm. long, yellow or red. (*P. rivularis*). Low land, west of Cascades; V. I. Alaska.

3. ***P. Aucuparia* (L.) Ehrh. (ROWAN TREE).** Tall, leaves odd-pinnate, leaflets many, oblong, acute or obtuse, pubescent at least beneath, serrate; calyx and pedicels usually woolly; flowers in a very broad corymb. Often spontaneous; a common, ornamental tree.

4. ***P. occidentalis* Wats. (MT. ASH).** One-2.5 m. high; glabrous, except the inflorescence; leaflets in 3-5 pairs, dull, oblong, obtuse, serrate at apex or entire and mucronate; cymes 2-4 cm. broad; sepals triangular, pubescent; fruit purple, glaucous. Cascade Mts.

5. ***P. sitchensis* (Roem.) Piper.** Nearly glabrous, leaflets oblong, mostly acute, shining, 5-7 pairs, serrate from near the base, (often doubly) cymes larger, fruit coral-red. Alaska to Idaho and eastward.

19. AMELANCHIER (JUNEBERRY, SASKATOON)

Shrubs with simple leaves and white, racemose flowers; petals oblong; stamens many; styles 5, united below; ovary 5-celled, by a partition from the back of each cell becoming 10-celled; fruit berry-like, crowned with the calyx. (The French name for a hawthorn).

1. ***A. Cusickii* Fer.** Glabrous throughout, twigs red, shining; leaves ovate-oblong, glabrous even when young, serrate from the rounded base; pedicels 8-12 mm. long; petals about 2 cm. long, calyx-lobes long-acuminate. D. I.; Kamloos; V. I.

2. ***A. florida* Lindl.** Stem 0.3-4 m. high; leaves oval to oblong or roundish tomentose beneath when young, serrate from near the base or usually only towards the apex; rounded at base or sub-cordate; sepals acute, tomentose within, or sometimes glabrous; petals 12-15 mm. long. Common throughout.

A glabrous form growing at Duncan, V. I., with narrow, glabrous sepals, and small petals may be a distinct species.

LEGUMINOSÆ (PEA FAMILY)

Herbs, shrubs or trees with alternate, usually compound stipulate leaves; sepals 5, more or less united, petals 5, apparently 4, dissimilar, the upper (the standard) largest and enclosing the others in the bud; the two lower united to form the keel, which encloses the stamens and pistil; the 2 lateral are the wings (alæ); stamens 10, 9 usually united by the filaments, 1 free; ovary 1-celled, becoming a legume; seeds without albumen.

Trees	16. Robinia.
Shrubs.	
Stems prickly	1. Ulex.
Stems not prickly	2. Cytisus.
Herbs.	
Leaflets 3, entire.	
Leaves glandular-dotted beneath	3. Psoralea.
Leaves not glandular-dotted	4. Hosackia.
Leaflets 3, not entire.	
Flowers in heads	5. Trifolium.
Flowers in spikes or racemes.	
Pod ovoid, wrinkled.	6. Melilotus.
Pod coiled or curved, often spinose	7. Medicago.
Leaflets more than 3.	
Leaves palmately compound	8. Lupinus.
Leaves pinnately compound.	
Leaves without tendrils, odd-pinnate.	
Leaves glandular	9. Glycyrrhiza.
Leaves not glandular.	
Flowers solitary or in umbels	4. Hosackia.
Flowers in spikes or racemes.	
Pod a loment	10. Hedysarum.
Pod obovate, wrinkled, prickly on the margin	11. Onobrychis.
Pod otherwise.	
Keel of the corolla acute or subulate at apex	12. Oxytropis.
Keel of corolla obtuse at apex	13. Astragalus.
Leaves usually with tendrils, even pinnate.	
Style filiform, with a tuft or ring of hairs at the apex	14. Vicia.
Style flattened upwards, hairy down the inner side	15. Lathyrus.

1. ULEX (FURZE, GORSE)

Prickly shrubs, the simple phyllodial leaves prickly-pointed or reduced to spines, branches hairy, often ending in a spine; calyx deeply 2-lipped, stamens monodelphous.

1. *A. europæus* L. Flowers large, rich yellow; calyx two-thirds as long as the petals, yellowish, tomentose; pods 1.5 cm. long. Introd. Victoria; Vancouver.

2. CYTISUS (BROOM)

Shrubs with green angular branches and trifoliate (rarely simple) leaves; calyx with 2 short, broad, lips; stamens monodelphous.

1. *C. scoparius* Link. Glabrous or nearly so, flowers bright-yellow, solitary or in pairs along the branches in the axils of the old leaves; style very long, spirally incurved. Introd.; becoming abundant at the Coast. An almost white var. is found on the New Westminster-Port Moody road.

3. PSORALEA

Perennial; leaves 3-5 foliate, closely beset below with glandular dots; flowers capitate; calyx-teeth triangular, the blunt keel united with the wings; pod ovate, about as long as the calyx, 1-seeded. (Greek *psoraleos*, scurfy).

1. *P. physodes* Dougl. Pubescent, 3-6 dm. high, leaves 3-foliate, the leaflets ovate, 2.5-3 cm. broad; calyx pubescent and glandular-dotted; petals about 1 cm. long, white or purplish. Saanich, V. I., Upper Columbia.

4. HOSACKIA (BIRD-FOOT CLOVER)

Herbs, leaves 3-15-foliolate; stipules foliaceous or gland-like; peduncles axillary; flowers 1-few, petals free from the stamen-tube, standard ovate or orbicular, keel incurved, pods linear, 1-several-seeded, continuous or with spongy partitions between the seeds. (Hosack was an American botanist).

Stipules normal, evident.

Flowers more than 1 cm. long, peduncled, in umbels	1. <i>H. bicolor</i> .
Standard yellow, wings white	2. <i>H. gracilis</i> .
Standard yellow, wings purple or pink	
Stipules mere glands or wanting.	
Flowers in umbels	3. <i>H. decumbens</i> .
Flowers solitary.	
Flowers on peduncles, 5 mm. long or more.	
Flowers 3 mm. long, plants slightly pubescent or glabrate	4. <i>H. parviflora</i> .
Flowers 5 mm. long, plants villous	5. <i>H. americana</i> .
Flowers sessile or nearly so	6. <i>H. denticulata</i> .

1. *H. bicolor* Dougl. Glabrous or nearly so, 2-5 dm. high, from a thick root; leaflets 5-9, obovate; stipules ovate; flowers 1 cm. long, umbellate on naked peduncles about equaling the leaves; the standard yellow, the wings white, pods long, linear. Wet places, ditches, etc. Victoria; Nanaimo; Columbia Valley.

2. *H. gracilis* Benth. Nearly glabrous; stems decumbent, reaching 5-6 dm. in length; leaflets 5 or 6, cuneate-obovate, mucronate above, truncate or emarginate below; peduncles $\frac{1}{3}$ longer than the leaves; flowers 3-5, 12-15 mm. long, in umbels, with a 3-foliolate bract just below the cluster; pods about 3 cm. long. Victoria (Miss Burris).

3. *H. decumbens* Benth. Villous, slender, ascending, 1-3 dm. high, from a thick root; leaflets 5-7, cuneate-obovate to oblong; flowers yellow, about a cm. long, umbellate on short, bracted peduncles; pod curved, long-beaked, pubescent, about 2-seeded. Open plains D. I.; Spence's Bridge.

4. *H. parviflora* Benth. A slender, glabrous annual, 1-3 dm. high; leaflets 3-5, obovate, on a hardly dilated rachis; flowers light-yellow fading red, on slender peduncles with a usually 3-foliolate bract, 1-few flowered; pod glabrous, often torulose, 1.5-2 cm. long, 3-7 seeded. Open, dry hillsides, V. I.; Vancouver.

5. *H. americana* (Nutt.) Piper. (SPANISH CLOVER). Annual, more or less silky-villous or glabrate, 1-3 dm. high; leaflets 3, (or 1), ovate to lanceolate, on a slightly dilated rachis; peduncles 1-flowered with a single, foliate bract; flowers salmon-colored or rose; pod 2 cm. long, 3-7 seeded. Dry soil, Esquimalt.

6. *H. denticulata* Drew. Stem sparingly pubescent or glabrous, erect, simple or branching, 2-5 dm. high; leaflets 3-5, on one side of the dilated rachis, oblong to obovate; flowers 3-4 mm. long, yellowish and reddish, nearly sessile in the axils, calyx-teeth entire or minutely denticulate; pods pubescent, 7-14 mm. long, 2-3 seeded. Victoria; Boundary Bay; Kamloops.

5. TRIFOLIUM (CLOVER, TREFOIL)

Herbs with stipulate, compound leaves; leaflets 3; flowers in heads which are often involucrate; calyx 5-cleft, the lobes setaceous; corolla persistent, the claws more or less united below with the calyx-tube; pods usually 2-seeded. (*L. tres*, three, *folium*, a leaf).

Heads not involucrate, mainly introduced species.

Flowers yellow.	
Terminal leaflet stalked.	
Flowers becoming furrowed in age	1. <i>T. procumbens</i> .
Flowers not furrowed, heads smaller	2. <i>T. dubium</i> .
All the leaflets sessile	3. <i>T. agrarium</i> .
Flowers red or pinkish.	
Heads globose.	
Flowers pinkish	4. <i>T. hybridum</i> .
Flowers red.	
Calyx soft-hairy	6. <i>T. pratense</i> .
Calyx nearly glabrous	7. <i>T. medium</i> .
Heads cylindrical	8. <i>T. incarnatum</i> .

Flowers white.	
Calyx-teeth $\frac{1}{2}$ shorter than the corolla	5. <i>T. repens</i> .
Calyx-teeth nearly equaling the corolla	9. <i>T. gracilentum</i> .
Heads involucrate, native species.	
Pubescent plants.	
Involucre nearly enclosing the head	10. <i>T. microdon</i> .
Involucre basal	11. <i>T. microcephalum</i> .
Glabrous plants.	
Standard conspicuously inflated.	
Stout, flowers ochroleucous	13. <i>T. furcatum</i> .
Slender, flowers red	14. <i>T. depauperatum</i> .
Standard not inflated.	
Tips of the calyx-teeth filiformly branching	12. <i>T. cyathiferum</i> .
Tips of the calyx-teeth not branching.	
Perennial from rootstocks, heads rather large	15. <i>T. fimbriatum</i> .
Annual, heads medium to small.	
Upper leaflets linear to oblong.	
Heads less than 1 cm. wide on filiform peduncles	17. <i>T. oliganthum</i> .
Heads many flowered, 1-2 cm. wide on stouter peduncles	16. <i>T. tridentatum</i> .
Leaflets obovate	18. <i>T. variegatum</i> .

1. ***T. procumbens*** L. (Low Hop C.) Spreading, pubescent, 1-2 dm. high; leaflets wedge-obovate, emarginate, stipules ovate, short; heads 8-12 mm. broad, flowers becoming striate and brown in age. Common.

2. ***T. dubium*** L. Similar, smaller, less pubescent; leaflets smaller; heads loosely few-flowered, 12 or less, 8 mm. broad or less. The commonest of this group at the Coast.

3. ***T. agrarium*** L. (Hop C.) Ascending, glabrate, 1-3 dm. high, stipules lanceolate, cohering with the petiole for more than half their length; leaflets obovate-oblong; slightly emarginate; heads 1 cm. or more broad; corolla becoming striate and brown in age. Common.

4. ***T. hybridum*** L. (ALSIKE C.) Somewhat like the following; perennial, 3-6 dm. high, stems not rooting at the nodes, stipules larger, peduncles shorter; leaflets ovate to obovate, rounded at the apex, or slightly emarginate, calyx one-fourth the length of the pinkish or nearly white corolla. An escape from cultivation.

5. ***T. repens*** L. (WHITE C.) Glabrous perennial, creeping, the stems rooting at the nodes; leaflets obovate, emarginate, serrulate; stipules small, membranaceous; peduncles long; flowers reflexed in age, calyx $\frac{1}{3}$ - $\frac{1}{2}$ as long, pod about 4-seeded. Common.

6. ***T. pratense*** L. (RED C.) Biennial or short-lived pubescent perennial; leaflets oval-oblong or obovate, obscurely denticulate, usually with a spot on the upper surface; heads ovoid, usually sessile; flowers red (rarely white), calyx pubescent. Escape from cultivation.

7. ***T. medium*** L. (ZIG-ZAG C.) Similar, more decidedly perennial and coarser; stem zig-zag, smoothish; leaflets oblong, entire, spotless, flowers deeper red, heads more or less peduncled, calyx-tube glabrous or nearly so. Reported from V. I.

8. ***T. incarnatum*** L. (CRIMSON C.) Annual, pubescent, 3-5 dm. high; leaflets obovate to nearly orbicular; heads crimson, cylindrical, 5 cm. long or less. Occasionally introd. A beautiful clover; observed a few years ago in Vancouver, not seen recently. Penticton.

9. ***T. gracilentum*** T. & G. Annual, subvillous to glabrous, 1-3 dm. high; stipules entire, leaflets linear-cuneate to obcordate, sparsely dentate, 0.8-1.5 cm. long, flowers soon reflexed; calyx-teeth subulate-setaceous, about equaling the whitish corolla. Cedar Hill (Macoun).

10. ***T. microdon*** H. & A. (CUP C.) Villous throughout, about 1 dm. high; stipules scarious, leaflets obcordate, 6-8 mm. long, denticulate; the involucre with about 8 oblong, several-toothed lobes; heads less than 1 cm. broad; calyx narrow, glabrous, with short lobes about 1 mm. long; flowers pinkish, clearly exceeding the calyx. Grassy places, V. I. and the Coast of the mainland.

11. **T. microcephalum** Pursh. (SAUCER C.) Villous throughout, 1-3 dm. high; stipules green or slightly scarious, leaflets oblanceolate to obovate, emarginate; about 1 cm. long, denticulate; the involucre basal, with about 8 entire triangular lobes; heads about 1 cm. broad; calyx very pubescent, slightly inflated, the scarious-margined teeth nearly equaling the tube, the purplish corolla hardly equaling the calyx. Grassy places along the Coast.

12. **T. cyathiferum** Lindl. (FRINGED C.) Erect or ascending, 1-3 dm. high; glabrous; leaflets obovate, about 1 cm. long, cuneate at base, obtuse at apex; heads 1.5 cm. broad or less; involucre broad, scarious, with about 8 short rounded lobes; corolla white, shorter than the calyx. Duncan, V. I.; Naramata.

13. **T. furcatum** Lindl. Stout, decumbent, 3 dm. long; stipules large, nearly or quite entire, leaflets obovate, obtuse or emarginate; involucre large; heads 2 cm. broad; calyx-teeth short; corolla yellowish, fading red; pods 3-8 seeded; seeds minutely granulate. Cedar Hill, Victoria (Macoun).

14. **T. depauperatum** Deso. (LOW C.) Low, 1 dm. high or less; glabrous; stipules small, entire; leaflets obovate to linear, 1 cm. long, or less; involucre small, scarious, laciniate-toothed or lobed; heads few-flowered; calyx scarious, not $\frac{1}{4}$ as long as the corolla, the filiform lobes equaling the tube; standard purplish-red, tipped with white; pods 1-2-seeded, seeds minutely roughened. Common about Victoria.

15. **T. fimbriatum** Lindl. (PERENNIAL C.) Stems prostrate or ascending, slender or stout, 3-5 dm. long, from a rootstock; stipules entire below, generally spinulose-toothed above; leaflets 1.5-2.5 cm. long, narrowly oblong to oval, cuneate at base, acute or obtuse at apex, or the lower obovate, obtuse and emarginate, spinulose-serrate; calyx-teeth slender, longer than the tube; heads solitary, terminal, on a long peduncle, 2-3 cm. broad; flowers purple, the standard and the wings tipped with white. (*T. heterodon*). Along the Coast, often in salt marshes; flowering in July.

16. **T. tridentatum** Lindl. (LANCE C.) Glabrous, erect, 1-4 dm. high; stipules scarious, the lower entire; leaflets 2-3.5 cm. long, linear-lanceolate, sometimes oval, or the lower occasionally small and obovate; spinulose-toothed; calyx-lobes shorter than the tube, broadening at the base, and often 3-toothed; flowers purple and white. Hillsides in the Coast region.

17. **T. oliganthum** Steud. (FEW-FLOWERED C.) Slender, ascending, glabrous, 1-2.5 dm. high; the upper leaflets oblong, somewhat spinulose-toothed, acute or truncate, 1.5-2 cm. long, the lower much shorter, obovate; flowers purple, whitish-purple tipped; calyx-lobes entire, shorter than the tube. (*T. pauciflorum* Nutt.) Grassy Hills, Coast.

18. **T. variegatum** Nutt. (VARIEGATED C.) Glabrous, decumbent, stems 0.5-3 dm. long; leaflets obovate, the apex rounded or emarginate, 0.5-2 cm. long; heads 0.5-1.2 cm. in diameter, flowers 2 to 15; calyx-lobes subulate, very slenderly pointed, equaling or longer than the tube, petals purplish with white tips. Grassy places; Coast. **T. dianthum** Greene. Stems stoutish, 2-3 cm. high; flowers 2; seems very similar. Esquimalt.

6. MELILOTUS (MELILOT)

Herbs, fragrant in drying; leaves trifoliate; flowers much as *Trifolium*, but in long, slender, spike-like racemes and corolla deciduous; calyx-teeth short; pod ovoid, wrinkled, hardly dehiscent. (Greek *meli*, honey, and *lotus*).

1. **M. officinalis** Lam. (YELLOW M.) Tall; leaflets narrowly obovate-oblong, serrulate, flowers yellow; petals nearly equal, pod cross-ribbed. Introd. about cities.

2. **M. alba** Desr. (WHITE M.; SWEET CLOVER). Tall; leaflets narrowly obovate to oblong, serrate; flowers white; pod somewhat reticulated, the standard longer than the other petals. Introd. about cities.

7. MEDICAGO (MEDIC)

Flowers much as in *Trifolium*, but in short, spike-like racemes, or heads; leaves pinnately 3-foliate; pods variously coiled. Introd. herbs. (From Media).

- | | |
|---|-------------------------|
| Flowers violet, conspicuous | 1. <i>M. sativa</i> . |
| Flowers yellow, small. | |
| Pod 1-seeded, curved not spiny | 2. <i>M. lupulina</i> . |
| Pod several-seeded, spinose. | |
| Pod loosely coiled, the edge not furrowed | 3. <i>M. hispida</i> . |
| Pod densely coiled, the edge furrowed | 4. <i>M. arabica</i> . |

1. *M. sativa* L. (ALFALFA). Perennial, pubescent, 3-9 dm. high; leaflets oblanceolate, denticulate at the truncate apex; peduncles 3-5 cm. long, bearing a short raceme; pod spirally twisted in 2-3 coils. Introd. Vancouver; Victoria, etc.

2. *M. lupulina* L. (BLACK MEDIC, NONE-SUCH). Annual, pubescent, procumbent; leaflets wedge-obovate, toothed at the apex; flowers in a short, cylindrical head; pods an imperfect spiral of one coil, kidney-shaped, 1-seeded. Common.

3. *M. hispida* Gærtn. (BUR CLOVER). Annual, glabrate, spreading, leaflets obovate, rounded or emarginate; flowers in small, peduncled heads; pods reticulated, in 2-3 coils with a thin keeled edge with 1-2 rows of curved prickles. (*M. denticulata*). Nanaimo.

4. *M. arabica* (SPOTTED M.) Spreading annual, arachnoid-pubescent; leaflets obcordate, often with a dark spot; flowers few, in small peduncled loose heads; pod globose, of 2-3 coils, with a thick furrowed edge between the 2 rows of prickles. Introd. Esquimalt.

8. LUPINUS (LUPINE)

Herbs, sometimes shrubby, with digitate leaflets and more or less verticillate spikes of blue or yellow flowers; stipules adnate by their lower half to the petioles; calyx 2-lipped, with or without small bracts (prophylls) between the entire or toothed lips; standard recurving, wings enclosing the keel; filaments monodelphous; anthers alternately oblong and roundish. (*L. lupus*, a wolf, because the plants were thought to devour the fertility of fields).

Flowers yellowish or whitish.

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|------------------------------|----------------------------|
| Annual; herbaceous | 1. <i>L. microcarpus</i> . |
| Perennial; shrubby | 2. <i>L. arboreus</i> . |

Flowers blue.

Annuals. Vancouver Is. plants chiefly.

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| Leaves cuneate obovate, seeds whitish | 3. <i>L. hirsutulus</i> . |
|---|---------------------------|

Leaves oblanceolate to linear.

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|--|---------------------------|
| Flowers 4-5 mm. long; pedicels 1-2 mm. long; seeds mottled | 5. <i>L. micranthus</i> . |
|--|---------------------------|

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|---|------------------------|
| Flowers 6-9 mm. long; pedicels 2-4 mm. long; seeds with a dark, oblique line on each face | 4. <i>L. bicolor</i> . |
|---|------------------------|

Perennials.

Leaves green, thinly pubescent or glabrous above.

Leaflets 10-17.

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|---|----------------------------|
| Simple, leaflets glabrous above | 6. <i>L. polyphyllus</i> . |
|---|----------------------------|

- | | |
|---|-----------------------------|
| Branching, leaflets appressed-pubescent above | 7. <i>L. grandifolius</i> . |
|---|-----------------------------|

Leaflets 5-10.

Pubescence of calyx and pedicels villous or strigose.

Leaves villous beneath; pedicels 4-9 mm. long; lower petioles not twice as long as leaflets.

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|--|--------------------------|
| Standard 10 mm. long, silky; stipules small or deciduous | 8. <i>L. argenteus</i> . |
|--|--------------------------|

- | | |
|---|-------------------------|
| Standard often 12 mm. long, smooth, stipules 10-15 mm. long | 9. <i>L. arcticus</i> . |
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|---|------------------------|
| Leaves sparingly appressed-pubescent beneath; pedicels 3-4 mm. long; lower petioles 2-3 times as long as leaflets | 10. <i>L. Burkei</i> . |
|---|------------------------|

Pubescence of calyx and pedicels short, silky-appressed.

- | | |
|---|----------------------------|
| Flowers 6-10 mm. long, calyx strongly saccate | 11. <i>L. laxiflorus</i> . |
|---|----------------------------|

Flowers longer, calyx not strongly saccate.

- | | |
|---|------------------------------|
| Branching; leaflets oblong-oblanceolate, approximate, appressed-pubescent on both sides | 12. <i>L. nootkatensis</i> . |
|---|------------------------------|

- | | |
|--|---------------------------|
| Sub-simple; leaflets oblanceolate, open, usually glabrous above; lower petioles longer | 13. <i>L. rivularis</i> . |
|--|---------------------------|

Leaves canescent on both sides.

Dwarf less than 1.5 dm. high, standard glabrous.

Leaflets less than 1 cm. long 14. *L. Lyallii*.

Leaflets more than 1 cm. long.

Pubescence shaggy 15. *L. aridus*.

Pubescence appressed 16. *L. minimus*.

Taller, standard hairy, except in Nos. 17 and 19.

Flowers subsessile, pedicels less than 4 mm. long.

Petioles 3-4 times as long as the leaflets (V.I.) 17. *L. lepidus*.

Petioles about as long as the leaflets (D.I.) 18. *L. leucophyllus*.

Flowers on pedicels 4-7 mm. long.

Prostrate, standard glabrous; maritime 19. *L. littoralis*.

Erect or ascending; standard pubescent; not maritime.

Leaves greenish, at least above 8. *L. argenteus* var.

Leaves white-sericeous.

Lower petioles not much longer than the leaflets 20. *L. ornatus*.

Lower petioles more than twice as long as the leaflets 21. *L. sericeus*.

1. *L. microcarpus* Sims. Annual, villous, 3-6 dm. high, stipules long, leaflets 7-9, glabrous above, obtuse or acutish, the petioles 2-3 times as long; flowers very distinctly venticellate, bracts persistent, calyx lobes very unequal long-villous; pod ovate, 15 mm. long; seeds 2, brown. Victoria.

2. *L. arboreus* Sims. Shrubby, about 1 m. high; leaflets narrowly oblanceolate, 2-3 cm. long, hardly exceeding the petioles, thick, glabrous above, silky below; flowers 12 mm. long, yellow; pod 5-8 cm. long. Garden escape near Beacon Hill, Victoria.

3. *L. hirsutulus* Greene. Stems decumbent, 2.5 dm. long, whitish beneath a short inner and a longer outer pilose pubescence; stipules long; petioles much longer than the hirsute leaflets; leaflets 5-7, small, obovate-cuneiform, very obtuse; racemes short, of about 4 rather crowded verticels; calyx short, densely silky-villous; corolla 6-7 mm. long, apparently light-purple; pods 2.5 cm. long, 5-7 seeded; seeds small, dull whitish. Beacon Hill, Victoria; apparently very closely related to the next.

4. *L. bicolor* Lindl. Stems ascending or decumbent, 1-2.5 dm. high, pubescence abundant, spreading; leaflets narrowly obovate to linear-oblanceolate, appressed-silky on both sides, but greenish, the petioles twice as long; flowers in verticels, standard white, with blue lateral margins, and dark purple dots down the middle; keel ciliate; pods 1.5-2 cm. long; seeds whitish, usually with a brown line diagonally across each side. Victoria; Yale. A white-flowered form occurs at Beacon Hill, Victoria (Dr. C.F. Newcombe); a pink-flowered, near Uplands.

5. *L. micranthus* Dougl. Somewhat erect, branching from the base; 1-2.5 dm. high; pubescence scantier, spreading throughout; leaflets linear to oblanceolate, 1-2 cm. long, glabrate above; petioles twice as long, corolla not much exceeding the calyx; standard purple with a white central band transversely dotted; pods about 2.5 cm. long; seeds 2.5 mm. long. Victoria.

6. *L. polyphyllus* Lindl. The simple not very leafy stems and the petioles with scanty appressed pubescence; 6-12 dm. high; the lower petioles very long; leaflets glabrous above, sparingly appressed-pubescent beneath, 5-12 cm. long; raceme often 5 dm. long; pedicels 5-10 mm. long, slender; bracts very deciduous; flowers 12-15 mm. long; calyx small, short-silky, the lobes nearly or quite entire; standard purple, fading brownish, shorter than the wings; keel naked, pod 4 cm. long; seeds mottled, light-brown, about as broad as long. Very common on the Lower Mainland, and extending to the Rockies.

7. *L. grandifolius* Lindl. (?). Similar; stems often branching, more pubescent, a few long hairs mingled with the short, spreading or even retrorse pubescence; leaves sometimes thickish, pubescent on both sides, hirsute on the midrib below; standard and wings subequal; keel ciliate; seeds dark-brown, oblong, pods rather strongly curved at base. Victoria.

8. *L. argenteus* Pursh. Tufted; stems and petioles hirsute; stems branching 3-6 dm. high; the lower petioles 1-1.5 times as long as the leaflets; stipules small, somewhat deciduous; leaflets 5-8, appressed-villous beneath, glabrous or

sparingly appressed-villous above, acute or obtuse, oblanceolate; raceme 1-1.5 dm. long; bracts sometimes persistent, short at flowering, peduncles 4-7 mm. long; flowers 1 cm. long, blue, purple or pink, the standard usually pubescent on the back, the keel ciliate. Crow's Nest Pass; Armstrong. Var. *argophyllus* Wats. Canescently silky-pubescent; the leaflets linear-oblanceolate to oblanceolate, densely silky on both sides. Okanagan Valley.

9. *L. arcticus* Wats. In clumps, 2-5 dm. high; stems simple, villous to nearly glabrous; leaflets 5-8, acute or obtuse, oblong-oblanceolate to nearly obovate, villous beneath, less so above, sometimes nearly glabrous; petioles once or twice as long, stipules 10-15 mm. long; raceme loose; flowers usually 12 mm. long, purple, blue or pink, on slender pedicels, 6-8 mm. long; standard glabrous; keel naked or slightly ciliate at the middle, seeds flattish, round, 3-4 mm. long, brown, slightly mottled. Coast and Cascade Mts.; Mt. Garibaldi; Mt. Cheam.

10. *L. Burkei* Wats. Stems and petioles with scanty, weak, appressed-pubescent; 5-9 dm. high; simple, in clumps; lower petioles 3-5 times as long as the leaflets; leaflets 7-10, 4-9 cm. long; acute or obtuse, glabrous above, sparsely appressed-pubescent beneath, racemes 1-2 dm. long, dense; pedicels 4 mm. long or less, and the raceme consequently narrow; bracts usually persistent, 1 cm. long, calyx and bracts villous with spreading hairs; pods 2-2.5 cm. long, 5-8 seeded. Revelstoke; Penticton; Coast and Cascade Mts.

11. *L. laxiflorus* Dougl. Tufted, slender, 3-4 dm. high, simple or branching, pubescence silky-appressed; stipules very small; leaflets 6-9, narrowly oblanceolate, arcuate, 2.5-5 cm. long, not half as long as the petioles, appressed-silky, especially beneath, green above; raceme loose, 8-15 cm. long; bracts deciduous; equaling the pedicels, 4-6 mm. long; calyx strongly saccate, almost spurred, the upper lip broad, toothed; corolla 6-10 mm. long, blue, or the wings rosy; keel naked. V. I. to Kootenay.

12. *L. nootkatensis* Donn. Stems and petioles more or less villous with spreading hairs, 4-10 dm. high, branching, in clumps; lower petioles 1-2 times as long as the leaflets, leaflets 6-8, slightly appressed-pubescent in both sides, stipules 10-15 mm. long; racemes loose 0.5-2 dm. long; flowers 12-15 mm. long, standard blue below, light purple to white above; keel usually naked; pedicels 6-9 mm. long, bracts deciduous or somewhat persistent, 5-10 mm. long, these and the calyx short-silky; pods 2.5-3.5 cm. long; seeds flattish, 4 mm. long, brown, mottled darker. Common on V. I. and on Queen Charlotte Is. Specimens from Nootka are much less pubescent than those from Shawnigan.

13. *L. rivularis* Dougl. Stems and petioles with scanty, soft, appressed-pubescent; 3-6 dm. high, branching, in clumps; lower petioles about twice as long as the leaflets; leaflets 6-9, 3-7 cm. long, usually obtuse, usually glabrous above, the appressed short pubescence beneath not dense; stipules short; raceme 0.5-2 dm. long, often loose; pedicels about 7 mm. long, rather slender; bracts deciduous, at flowering shorter; calyx densely short-pubescent; corolla about 12 mm. long; keel ciliate at the middle, or naked, standard light-blue. Coast Mts. and Cascade Mts.; Spence's Bridge; Nootka, V. I.

14. *L. Lyallii* Gray. Pubescence appressed; stems 0.5-1.5 dm. high; from a woody caudex, the small leaflets obovate, acutish, the slender petioles 3 times longer; raceme very short, peduncles exceeding the leaves; standard elliptical, blue, petals 1 cm. long, nearly equal; pods silky. Alpine, Cascades.

15. *L. aridus* Nutt. Cæspitose, 1 dm. high or less, pubescence silky-hirsute fulvous; leaflets about 7, oblanceolate, acute, 2-2.5 cm. long; raceme dense, 5 cm. long, the peduncles shorter than the leaves; flowers purple, 10 mm. long; standard elliptical, shorter than the wings; pods very hairy 1 cm. long. Za-kwas-ki Mt., Nicomen River, and dry sandy places in Interior.

16. *L. minimus* Dougl. Appressed silky-villous, 1-1.5 dm. high; leaflets obovate to lanceolate, mostly acutish, 6-15 mm. long, petioles 3 times longer;

peduncles equaling or exceeding the leaves; flowers purple, 8-10 mm. long, the standard orbicular. Sources of Columbia.

17. *L. lepidus* Dougl. Stems somewhat decumbent, densely silky, with few leaves, about 2 dm. long, pubescence appressed; leaflets 7-9, about 2 cm. long, folded, densely silky petioles 4-6 times as long; raceme 1 dm. long or less, pedicels very short, bracts persistent; flowers subsessile less than 1 cm. long, light-blue; keel ciliate or naked, standard glabrous, pods 1-2 cm. long; calyx oblanceolate densely villous; seeds mottled black. Victoria.

18. *L. leucophyllus* Dougl. Stems leafy, stout, 4-6 dm. high; sub-appressed-villous; stipules long, leaflets 2.5-5 cm. long, 7-10, acute, oblong-oblanceolate densely villous the petioles about equaling the leaves; or the lower twice as long; raceme dense, nearly sessile, pedicels 2-4 mm. long; flowers about 1 cm. long, subverticillate, the standard very hairy, keel ciliate. Southern border of D. I.

19. *L. littoralis* Dougl. (CHINOOK LICORICE). Stems prostrate or decumbent, 3-5 dm. long, leafy, thinly silky; leaflets 5-8, folded, 2-4 cm. long; not so densely silky; raceme about 1 dm. long; bracts sub-persistent; flowers about 1 cm. long on pedicels 4 mm. long; calyx-lobes ovate, silky on the outside, nearly glabrous within; standard purplish marked with black spots, keel ciliate; pods 2 cm. long, seeds ellipsoidal much longer than wide, 3 mm. long, dark mottled, with a marked cavity at the hilum. Sandy shores, Savary Is., northward. The roasted roots are eaten by the Indians.

20. *L. ornatus* Dougl. Stems 3-6 dm. high, not very stout; pubescence dense, short, appressed; leaflets 5-8, oblanceolate, 2-4 cm. long, usually acute, racemes 1-1.5 dm. long, short-peduncled; bracts shorter than the buds, stipules short; pedicels 6 mm. long, upper calyx-lip slightly toothed; flowers about 1 cm. long, verticillate, petals blue, the standard paler, especially at the centre, the pale keel ciliate, the flowers thus conspicuously 2-colored; ovules 5-8; seeds white. D. I., Vernon to Wn.

21. *L. sericeus* Pursh. Rather stout, 3-6 dm. high, pubescence dense, sub-silky; stipules long-setaceous; leaflets 5-8, oblanceolate, 2-5 cm. long, acute; racemes short-peduncled, bracts deciduous, often much exceeding the calyx, upper calyx-lip slightly toothed; keel ciliate; pedicels about 5 mm. long. Plains and hillsides; Spence's Bridge to Rockies.

9. GLYCYRRHIZA (LICORICE)

Perennial from large, sweet roots; leaves odd-pinnate, glandular-viscid, stipules deciduous; flowers in dense, axillary, peduncled spikes; calyx gibbous at base, the wings of the corolla exceeding the keel; pod ovate, flattish, beset with hooked prickles. (Greek *glykus*, sweet, *rhiza*, a root).

1. *G. lepidota* Nutt. Stout, 6-9 dm. high; leaflets oblong to lanceolate, sprinkled with little scales when young, and with dots when old; flowers yellowish-white, 1 cm. long. Columbia Valley near the 49th parallel.

10. HEDYSARUM (LOMENTS)

Herbs with odd-pinnate, minutely pellucid-punctate leaves and scarious stipules; calyx 5-cleft, the lobes narrow, keel obliquely truncate, prominent, longer than the wings; pod a loment; flowers in showy spikes on long peduncles. (Greek *hedys*, sweet, *aroma*, a smell).

Flowers yellow or creamy	1. <i>H. sulphurescens</i> .
Flowers purplish	
Flowers hardly reflexed	2. <i>H. Mackenzii</i> .
Flowers strongly reflexed	3. <i>H. boreale</i> .

1. *H. sulphurescens* Rydb. (YELLOW L.) Erect, 3-4 dm. high, nearly glabrous; leaflets 9-15, ovate-oblong; racemes 1 dm. or so long, elongate in fruit; flowers light-yellow, 15-18 mm. long, the wings exceeding the standard, but shorter than the keel; pods 2-3-jointed, 2-3.5 cm. long. Open woods, Golden.

2. **H. Mackenzii** Rich. (PURPLE L.) Stems decumbent, 3-5 dm. long; leaflets 7-15, ovate-oblong; raceme 6 cm. long or less; flowers 17 mm. long, purple, not reflexed at time of flowering; calyx-tube shorter than the slender teeth; pod about 6-jointed. D. I., Similkameen to Rockies.

3. **H. boreale** Nutt. Erect, 3-4 dm. high; leaflets 11-13, oblong or lanceolate; flowers 13 mm. long, light purple, sometimes white, reflexed, 15 cm. long; calyx-tube 3-4 mm. long, the lanceolate teeth shorter; joints of pod 3-4. Alaska southward along the Rockies; Banff.

11. ONOBRYCHIS (SAINFOIN)

Perennial; leaves odd-pinnate with scarios sheathing stipules; flowers in spikes, pink, the wings one-quarter as long as the keel; the narrow calyx-lobes much longer than the tube; pod pubescent, obovate, flat, transversely wrinkled, and more or less bristly on the sides, with short, marginal prickles, 1-seeded.

1. **O. sativa**. Tall, 3-6 dm. high; with about 7 pairs of oblong-elliptical leaflets; flowers showy, petals pink, veined with deep pink. A fodder plant, plentiful about the irrigating ditches at Spence's Bridge.

12. OXYTROPIS (LOCO-WEED)

Tufted perennials, with short stems, and aspect of *Astragalus*, from which this genus is distinguished by the subulate beak at the tip of the keel; inflorescence a spike or head borne on a scape; pod more or less 2-celled by the intrusion of the ventral upper suture. (Greek *oxys*, sharp, *tropis*, a keel). *Aragallus* Neck.

Stipules free from petiole, pod deflexed	1. <i>O. deflexa</i> .
Stipules adnate, pod erect.	
Leaflets in fascicles, 2-4 along the rachis	2. <i>O. Richardsonii</i> .
Leaflets normally pinnate.	
Pod inflated; flowers violet; alpine	3. <i>O. podocarpa</i> .
Pod not inflated.	
Calyx glandular	4. <i>O. viscida</i> .
Calyx not glandular.	
Flowers purple	5. <i>O. Lamberti</i> .
Flowers yellow	6. <i>O. monticola</i> .

1. **O. deflexa** D. C. Silky-pubescent, leafy-stemmed or stemless, 2-4 dm. high, leaflets crowded, oblong, acute, 1-1.5 cm. long; flowers 8 mm. long, pale purple, in slender spikes, 0.5-1 dm. long; pod oblong-lanceolate, 1-celled, strongly deflexed. Eastern side of the Rockies; Bow River; dry plains southern British Columbia.

2. **O. Richardsonii** Hook. Silky-villous, 1-4 dm. high; leaflets verticillate, oblong lanceolate; scapes many-flowered; calyx very hairy, white; flowers blue-purple; pod partly 2-celled; ovate acuminate hairy. (*O. splendens* Richardson). Valleys of the Rockies.

3. **O. podocarpa** Gray. Low, villous or glabrate, leaflets 11-23, linear-lanceolate, 5-8 mm. long; flowers 1-2 on peduncles hardly exceeding the leaves, violet-purple; calyx dark-hairy; pod 2 cm. long, bladderly, broadly ovate, neither suture inflexed, pubescent. (*O. inflatus*). High slopes, Rockies.

4. **O. viscida** Nutt. Tufted, 1-2 dm. high; pubescent, but green; leaflets 17-31, 6-10 mm. long, more or less glandular; flowers pink to purple, 10-12 mm. long, on scapes much exceeding the leaves; calyx with long white, and short black, hairs; the teeth much shorter than the tube; pod beaked and with a hooked style. Rockies; Laggan.

5. **O. Lamberti** Pursh. (LOCO-WEED). Silky-pubescent; scapes 2-3 dm. high, leaflets oblong-lanceolate to linear, 1-2.5 cm. long, spike 4-16 cm. long; calyx strigose, the teeth short; flowers 1.5-2 cm. long, purplish, rarely white; pod coriaceous, erect, lanceolate-oblong, silky-pubescent, almost 2-celled. Dry plains, Spence's Bridge, eastward; Valley of Bow River.

6. **O. monticola** Gray. Silky-pubescent to short-villous, leaflets 17-29, oblong-lanceolate, sometimes greenish; scape longer than the leaves; raceme 2-10 cm. long, usually loose; calyx white-pubescent or with some black hairs intermingled; pod silky, beaked and with a hooked style, the ventral suture extending to the middle of the cell. Common east of the Cascades.

13. ASTRAGALUS (MILK VETCH)

Herbs with odd-pinnate leaves, evident stems and racemed or sub-capitate flowers; calyx 5-toothed; corolla long and narrow, the keel blunt; stamens diadelphous; pod 1-celled or incompletely 2-celled by the intrusion of sutures, or completely 2-celled. (The old Greek name of some plant, as also of the ankle-bone).

Pod completely 2-celled.

Pod inflated, thin becoming membranaceous 1. *A. lentiginosus*.

Pod not inflated.

Herbage white-silky 2. *A. Lyallii*.

Herbage not white-silky.

Flowers yellowish, inflorescence 8-12 cm. long 3. *A. Mortoni*.

Flowers purple, inflorescence capitate.

Pod rather sparsely appressed-pubescent 4. *A. adsurgens*.

Pod densely villous.

5. *A. hypoglottis*.

Pod 1-celled, though sometimes incompletely 2-celled, by intruding sutures.

Pod obcompressed (flattened dorso-ventrally).

Pods glabrous, the sutures much intruded 6. *A. Beckwithii*.

Pods densely villous, the sutures not intruded 7. *A. Purshii*.

Pod not obcompressed (teretish or compressed laterally).

Pods stipitate.

Pods glabrous.

Stipules and pods black, flowers yellow 8. *A. tenellus*.

Stipules foliaceous, flowers white 9. *A. americanus*.

Stipules scarious, 2 mm. long, flowers white 10. *A. stenophyllus*.

Pods pubescent.

Stipe nearly as long as the curved pod, flowers whitish 15. *A. speirocarpus*.

Stipe not much, if at all exceeding the calyx.

Pods black-pubescent.

Pod deeply grooved dorsally, inflorescence capitate 12. *A. alpinus*.

Pod not deeply grooved, inflorescence elongated 13. *A. Macounii*.

Pods not black-pubescent.

Flowers 3-7 14. *A. Bourgouvii*.

Flowers numerous 11. *A. collinus*.

Pods sessile; neither suture intended in Nos. 18, 19, 20.

Pods black-pubescent 16. *A. elegans*.

Pods not black-pubescent.

Pods not compressed laterally, flowers yellow 17. *A. lotiflorus*.

Pods compressed laterally.

Calyx-teeth exceeding the tube, flowers yellow 18. *A. pauciflorus*.

Calyx-teeth not exceeding the tube.

Leaflets oblong-linear, keel of corolla broad-beaked; flowers whitish or pinkish 19. *A. campestris*.

Leaflets linear-filiform; keel of corolla narrow-beaked; flowers ochroleucous or purplish 20. *A. decumbens*.

1. **A. lentiginosus** Dougl. Slightly pubescent, tufted, 1.5-3 dm. high; stipules ovate; leaflets 11-19 obovate, oblanceolate or oblong, 6-12 mm. long, sessile; pods turgid, membranaceous, ovoid, acuminate, more or less incurved, 8-12 mm. long, puberulent, often mottled. Dry plains, Nicola; Kamloops.

2. **A. Lyallii** Gray. White-silky, 2-3 dm. high; leaflets 19-25, 6-12 mm. long, lanceolate to oblong-linear; peduncles not exceeding the leaves, spikes long and loose; flowers 6 mm. long, calyx villous, the teeth equaling the tube; pods 4-8 mm. long, hoary, grooved. Perhaps on the Boundary north of Yakima, Wn.

3. **A. Mortoni** Nutt. Tall, erect, 3-10 dm. high; pubescent, the upper surface of the leaves glabrate, the lower appressed-silky; stipules membranaceous; leaflets 11-21, oblong, obtuse, 1-2.5 cm. long; flowers nearly sessile, in a dense spike, 8-12 cm. long, soon reflexed; corolla greenish-yellow; calyx-teeth less than half as long as the tube, which is glabrous at base; pods pubescent, 1.5 cm. long, grooved dorsally. D. I.; Summerland.

4. **A. adsurgens** Pall. Ascending or decumbent, minutely pubescent, 1-4 dm. high; leaflets 15-23, narrowly oblong, 12-18 mm. long; spike dense, flowers purple, calyx appressed-pubescent, the teeth half as long as the tube; pod oblong-ovoid, coriaceous, sessile, pubescence appressed, triangular-compressed, with a deep, dorsal groove. Rockies, eastward.

5. **A. hypoglottis** L. Glabrate, low and slender, ascending or procumbent, stems 1-3 dm. long; stipules rather large, green; leaflets 15-21, oblong to oval, obtuse or retuse, 10-15 mm. long, glabrate above, calyx hirsute, the teeth linear, clothed with black hairs, half as long as the tube, corolla 12 mm. long; pod as in the last, but ovate and silky-villous. Very common Vernon and D. I.; Alaska; (*A. goniatius* Nutt.)

6. **A. Beckwithii** T. & G. Glabrous, diffusely branched, 2-5 dm. long; stipules somewhat adnate to the petiole; leaflets 13-25, broadly oval to obovate; flowers 5-8 in a short raceme, yellow; calyx glabrous, the lance-linear teeth nearly equaling the tube; pods 1.5-2.5 cm. long, 12 mm. broad, strongly obcompressed, slightly arcuate; finely transversely rugose dorsally, the ventral suture winged. D. I. common. Lytton; eastward to Columbia Valley.

7. **A. Purshii** Dougl. Tomentose, especially the stem, diffusely branching from the base, the branches spreading; leaflets 9-17, oval, 1-2 cm. long, acute, flowers few, with an elongated calyx, 15 mm. long; corolla ochroleucous, tinged with purple; pod strongly compressed dorsally, arcuate, 2 cm. long, 1 cm. wide. D. I., plains, Okanagan Valley.

8. **A. tenellus** Pursh. Lightly pubescent, 2-5 dm. high; stipules dark, the lower sheathing; leaflets 13-21, linear-oblong, glabrous above, 7-12 mm. long; peduncles slender; the whitish-yellow or purple-tinged flowers 6-8 mm. long; calyx appressed white-pubescent, the lanceolate teeth hardly as long as the tube; pods 8-12 mm. long, laterally flattened, reflexed, glabrous, black, reticulately veined, 15 mm. long, the stipe about equaling the calyx-tube. (*A. multiflorus* Gray.) Spence's Bridge; Rockies.

9. **A. americanus** Rydb. Glabrous or nearly so, 3-5 dm. high; stipules foliaceous, 5-10 mm. long; leaflets 7-17 oval, 2-3 cm. long; peduncles equaling the leaves; flowers white, 1.5 cm. long, in short racemes; pod glabrous, inflated, 2 cm. long, shining; the stipe equaling the calyx tube. (*A. frigidus americanus* Wats.) Northern, southward in Rockies; South Kootenay Pass.

10. **A. stenophyllus** T. & G. Erect, 3-5 dm. high, pubescent; leaflets 7-15, linear, 8-15 mm. long; peduncles much longer than the leaves; flowers whitish to yellowish; calyx somewhat black-pubescent, the narrow teeth about $\frac{1}{4}$ as long as the tube; pods 18-30 mm. long, 4-5 mm. broad, glabrous, finely reticulated, long-stipitate. Nicola Valley.

11. **A. collinus** Dougl. Erect or diffuse, 2-5 dm. high, grayish-pubescent; leaflets 19-23 oblong, obtuse, about 1 cm. long, stipules small; peduncles more than twice as long as the leaves; flowers whitish; calyx-teeth triangular, about half as long as the tube; pods reticulated, pubescent, long-stipitate, 3-5 mm. wide, 2.5 cm. long. Spence's Bridge, Okanagan.

12. **A. alpinus** L. Slender, 0.5-1.5 dm. high, lightly pubescent; leaflets 11-23, oblong-ovate, 5-10 mm. long; flowers in a short raceme or almost capitate, purplish, about 12 mm. long, nearly sessile; calyx black-pubescent, the teeth short; pod deflexed, stipitate, deeply grooved on the lower side, black-hairy. Alaska southward in the Rockies; Columbia Valley; Alaska.

13. **A. Macounii** Rydb. Stem lightly pubescent, 5-6 dm. high; stipules ovate-lanceolate, leaflets 9-17, thin, oblong to oval, or the lower ovate obtuse, 15-25 mm. long, glabrous above, raceme 4-15 cm. long, on a short peduncle; flowers creamy, tinged with purple, or purplish, on pedicels 2-3 mm. long; calyx black-hairy, with short lobes; pod membranaceous, hardly 7 cm. long, triangular in cross section, neither suture grooved, the dorsal intruded. (*A. Robbinsii occidentalis*). Arrow Lakes; Bow River; Crow's Nest Pass.

14. **A. Bourgovii** Gray. Stems short, numerous, thinly pubescent; leaflets 11-13, lanceolate, glabrous above, 4 mm. long; flowers 3-7, dark-violet, calyx-teeth half as long as the tube; pods flattened laterally, pubescent, mottled, 1.5 cm. long, stipes shorter than the calyx. Rockies; Bow River Pass; South Kootenay Pass.

15. **A. speirocarpus** Gray var. *falciformis* Gray. Cinereous pubescent, 3-6 dm. high, decumbent, leaflets distant, linear or narrowly oblong, often retuse, 1-2 cm. long, glabrate above; flowers 12 mm. long, in an open raceme, yellowish, the keel purple; calyx gibbous at base, with very short teeth; pubescence black, appressed; teeth short, triangular; pod pubescent, slightly inflated, 3 cm. long, falcate, on a stipe twice as long as the calyx. Dry plains, Summerland.

16. **A. elegans** Sheld. Cinereous-puberulent, 3-5 dm. high; leaflets 9-17 oval or narrowly oblong, stipules ovate; flower purple, 5-7 mm. long, in long 1-sided racemes; pod sessile, pendent, slightly inflated, 5-6 mm. long, ellipsoidal. (*A. oroboides americanus*). Near mt. streams, Rockies, Peace River.

17. **A. lotiflorus** Hook. Villous, erect, stems very short; leaflets 7-15, oval or oblong, obtuse and sometimes mucronulate; flowers yellow, 8-12 mm. long, in short, dense spikes, peduncles usually shorter than the leaves; calyx-teeth exceeding tube; pod 2 cm. long, villous, ovoid-oblong. D. I.

18. **A. pauciflorus** Hook. Cinereous-pubescent, low, matted-decumbent; leaflets 7-11, crowded, lance-oblong, stipules more or less connate; flowers violet, 2-5; pod linear-oblong, silky puberulent, about 1 cm. long. South Kootenay Pass.

19. **A. compestris** Gray. Slightly pubescent, tufted, 2-4 dm. high, stipules membranaceous below, less so above; leaflets 7-13, distant, 2 cm. long, narrowly oblong to nearly linear; peduncles long and slender; flowers few to many, whitish to mauve, tinged with purple, 8-19 mm. long; calyx-teeth $\frac{1}{3}$ the length of the tube, some black hairs among the pubescence; pod linear-oblong, not much flattened, 2-2.5 cm. long, lightly pubescent or glabrous, finally deflexed. Very common, Lytton eastw.

20. **A. decumbens** Gray. Cinereous or silky-pubescent, tufted, ascending, 2 dm. high; leaflets 7-13 linear-lanceolate; racemes 5-10 flowered; corolla ochroleucous or purplish, 8-10 mm. long; calyx-teeth a little shorter than the tube, straight or curved; pod linear-oblong, 2 cm. long, straight or arcuate, hairy-pubescent. Spence's Bridge.

14. VICIA (VETCH)

Herbs, climbing by tendrils terminating the pinnate leaves; calyx 5-cleft, the 2 upper lobes often shorter; wings of the corolla adherent (not coherent) to the keel; stamens diadelphous; style hairy all around the apex, or only at the back; pods 2-several seeded. (The Latin name).

Peduncles short or none.

Flowers 6 mm. long, seeds rough 1. *V. lathyroides*.

Flowers 1 cm. or more in length, seeds smooth.

Pods black 2. *V. sativa*.

Pods brown 3. *V. angustifolia*.

Peduncles long.

Flowers 3 mm. long, pod 2-seeded 4. *V. hirsuta*.

Flowers 1 cm. or more in length.

Plants villous with spreading hairs. 6. *V. villosa*.

Plants glabrate or the pubescence appressed.

Flowers 4-15, 1.5 cm. long, or more.

Flowers narrow, soon yellowish brown 7. *V. gigantea*.

Flowers broad, blue 8. *V. americana*.

Flowers 25 or more, less than 1.5 cm. long 5. *V. cracca*.

1. *V. lathyroides* L. Low, resembling a small *V. sativa*, 1-2 dm. high, pubescent throughout; leaflets 2 or 3 pairs, narrowly oblong to narrowly obovate, obtuse or retuse, mucronate; flowers small, solitary, on very short pedicels; pods 2 cm. long, smooth; seeds somewhat angular or cubical. Langford, V. I.

2. *V. sativa* L. (SPRING V.) Pubescent, becoming glabrate; leaves essentially uniform, leaflets 4-8 pairs, oblong to obovate, truncate to emarginate and mucronate, 3 cm. long, or less; flowers mostly in 2's, standard purplish, showy, pod brown. Introduced, fields.

3. *V. angustifolia* Reich. (COMMON V.) Similar; less pubescent, or glabrate; leaflets 2-6 (rarely 7) pairs, linear to oblong, pointed and mucronate above, or many truncate especially below; standard pale-purple, pod black. Introd. very abundantly about Victoria. Var. *segetalis* Koch. Leaflets oblong-obovate, nearly all truncate or emarginate. Introd. widely.

4. *V. hirsuta* S. F. Gray. (HAIRY V.) Slender, leaflets 6-8 pairs, narrowly oblong, but broadest below the middle, truncate; flowers 3-7, whitish; pods 1 cm. long, 2-seeded, hairy. Introd. common about Victoria; Crescent.

5. *V. cracca* L. (Cow V.) Appressed pubescent, leaflets 8-24, oblong, lanceolate, strongly mucronate; racemes densely many-flowered, 1-sided; flowers blue, turning to purple, 1-1.4 cm. long, gibbous at base. Introd. D. I.

6. *V. villosa* Roth. (HAIRY COW V.) Similar; stems, peduncles and leaves villous, flowers 1.8 cm. long, white and violet, narrow, strongly gibbous at base. Introd. Spence's Bridge.

7. *V. gigantea* Hook. (TALL V.) Slightly pubescent, stout and tall; leaves 2 dm. long; leaflets about 11 pairs, ovate-oblong; stipules entire on the well-developed upper part, toothed on the lower; peduncles 5-15-flowered; flowers faintly purplish or ochroleucous, soon yellowish-brown; mature pods glaucous, black, about 4 cm. long, 1 cm. broad; seeds dark-brown with obscure purplish marking. Thickets near the coast; Alaska to Cal.

8. *V. americana* Muhl. (PEA VINE). Glabrate, more slender; leaves 1 dm. long or less; leaflets about 7 pairs, elliptical to ovate-oblong, very obtuse; the upper part of the stipules narrow; peduncle 4-8-flowered; flowers blue or pinkish purple; pods 6-8 mm. broad, common. Var. *angustifolia* Nees. Leaflets linear. Victoria; Vancouver; Nanaimo. Var. *truncata* Brewer; Leaflets conspicuously truncate. With species, Vancouver, etc.

15. LATHYRUS (PEA)

Style dilated and flattish above, hairy along the side next the free stamen; filament-tube scarcely oblique at apex; otherwise as in *Vicia*, but the flowers and leaves are, in general, larger.

Stipules nearly as large as the leaflets.

Leaves tendril-bearing 1. *L. maritimus*.

Leaves without tendrils 2. *L. littoralis*.

Stipules much smaller than the leaflets.

Flowers yellow or white 3. *L. ochroleucus*.

Flowers blue.

Leaflets 4-12.

Stems winged, plant glabrous or nearly so 4. *L. palustris*.

Stems barely winged, plant pubescent 5. *L. Nuttallii*.

Leaflets 2 6. *L. latifolius*.

1. *L. maritimus* Bigel. (BEACH PEA). Glabrous, stout, trailing or climbing, stems 2-6 dm. long; leaflets 3-5 pairs, oblong-elliptical; peduncles often longer than the leaves; flowers 6-10, large, purple-pods 5-7 cm. long. Sea shores, Alaska to Oregon.

2. *L. littoralis* Endl. (SHORE PEA). Densely silky throughout, 2-4 dm. high, decumbent; stipules much broader than the oblong-obovate leaflets; the terminal leaflet shorter and narrower; peduncles stout, twice as long

as the leaves, flowers blue, about 13 mm. long; pods 2 cm. long, and half as broad, semi-circular. Sandy shores, Ahousset, V. I.

3. *L. ochroleucus* Hook. (YELLOW PEA). Slender, glabrous, 3-9 dm. high, climbing; stipules one-half to one-quarter as long as the leaves; leaflets 3-4 pairs, ovate-elliptical, glaucous beneath; peduncles about equaling the leaves, with 6-10 large, yellow or whitish flowers. Dry thickets, Agassiz, eastward.

4. *L. palustris* L. (MARSH PEA). Slender, nearly glabrous, (the petioles of the leaflets pubescent) climbing, 5-10 dm. high; leaflets 2-4 pairs, 3-4 cm. long, 1-1.5 cm. wide; peduncles as long as the leaves, with 2-6 purple flowers, 1.5-2.5 cm. long. Prefers a damp habitat. Boundary Bay; Barclay Sound; Alaska; Rockies. Var. *linearifolius* Ser. Leaflets 2-3 pairs, linear to lanceolate, flowers smaller. Northward; an imperfect specimen from the shore of Gambier Island is doubtfully placed here.

5. *L. Nuttallii* Wats. (PURPLE PEA). Pubescent with loose, woolly hairs, 3-6 dm. high, hardly climbing; stipules narrow; leaflets 3-5 pairs, ovate-lanceolate to oblong, acute at both ends, 3-4 cm. long, peduncles equaling the leaves or shorter; calyx sometimes purplish; flowers violet or rose-purple, 16-20 mm. long. Rich woods, V. I., and west of Cascades.

6. *L. latifolius* L. (PERENNIAL PEA). Tall with broadly winged stems, and petioles, leaflets 2, elliptical, 5-10 cm. long; peduncles stiff with many purple flowers. A garden escape, Victoria.

16. ROBINIA (FALSE ACACIA)

1. *Robinia Pseudo-Acacia* L. (LOCUST). A tree with drooping racemes of white, fragrant flowers, often with spines for stipules; leaves odd-pinnate; pod flat, several-seeded. A garden escape; Yale, Moodyville.

LINACEÆ (FLAX FAMILY)

Herbs with regular, hypogynous flowers, 4-6 merous; calyx imbricated, petals convolute; stamens 5, united at base; pod 8-10 seeded, with twice as many cells as styles.

LINUM (FLAX)

Leaves simple, entire; flowers 5-merous; petals blue or white (in ours), pods 5-valved, becoming 10-celled, seeds flattish. The cortex furnishes the linen fibre. (The Latin name).

1. *L. usitatissimum* L. (COMMON F.) Erect annual, 3-5 dm. high; corymbosely branched at top; leaves linear-lanceolate, erect, 2-3 cm. long; at least the inner sepals minutely ciliate; petals 1 cm. long, sometimes white; stigmas elongated; false septa of pod not ciliate; capsule 6-8 mm. wide. A common introd. plant.

2. *L. Lewisii* Pursh. Perennial, 3-9 dm. high, often branching from base; leaves erect, 1-2 cm. long, linear-lanceolate; sepals ciliate; petals 1.5 cm. long, stigmas short, no longer than thick; septa ciliate; capsule 5-6 mm. wide. Eastern B. C.; Alaska.

GERANIACEÆ (GERANIUM FAMILY)

Herbs with perfect 5-merous, hypogynous flowers and lobed or divided leaves; glands of the disk 5, alternate with the petals; stamens 5 or 10, some of them often sterile; ovary of 5 carpels separating elastically at maturity with long styles from a central axis.

Fertile stamens usually 10, styles smooth in fruit on the inner side	1. <i>Geranium</i> .
Fertile stamens 5, styles bearded in fruit on the inner side, and twisted	2. <i>Erodium</i> .

1. GERANIUM (CRANESBILL)

All the 10 stamens fertile except in *G. pusillum*, the 5 longer with glands at base; stems forking. (Greek *geranos*, a crane, in allusion to the beaked fruit).

Leaves 3-divided, carpel-body deciduous from style	1. <i>G. Robertianum</i> .
Leaves palmately lobed, carpel-body attached to style.	
Petals 1 cm. long or more.	
Pedicels retrorsely pubescent, the hairs not at all glandular	2. <i>G. erianthum</i> .
Pedicels with spreading pubescence.	
Petals purple	3. <i>G. viscosissimum</i> .
Petals white or heliotrope	4. <i>G. Richardsonii</i> .
Petals less than 1 cm. long.	
Seeds smooth or merely striate.	
Carpels pubescent	5. <i>G. pusillum</i> .
Carpels glabrous, rugose.	6. <i>G. molle</i> .
Seeds reticulated or pitted.	
Inflorescence dense	7. <i>G. carolinianum</i> .
Inflorescence open.	
Beak of fruit 4-6 mm. long	8. <i>G. Bicknellii</i> .
Beak of fruit 2 mm. long	9. <i>G. dissectum</i> .

1. *G. Robertianum* L. (HERB ROBERT). Diffusely branched with weak stems, strong-scented; leaves 3-divided, the divisions 2-pinnatifid; sepals awned; petals long-clawed, nearly 1 cm. long, red-purple; carpels wrinkled, seeds smooth. Introd. Victoria; Vancouver; Kootenay.

2. *G. erianthum* DC. (NORTHERN G.) Stem solitary, usually simple, finely appressed-pubescent; leaves 5-7-parted, the divisions many-toothed, pubescent beneath; sepals elliptical-oblong, pilose with long, silky shining hairs, rather abruptly tapering to an awn 3-4 mm. long; petals bluish to rose-purple, 15-20 mm. long, pubescent at base; style-column hardly glandular, 20-30 mm. long; carpels villous; seeds slightly reticulated. Queen Charlotte Islands, northward to Alaska.

3. *G. viscosissimum* F. & M. Coarse, 2-5 dm. high; branching, hirsute-glandular; leaves thickish, large, 3-5-parted, the divisions toothed, hirsute beneath; pedicels glandular; sepals awn-tipped, the awn 2-3 mm. long; petals 12-18 mm. long; style-column and carpels glandular-pubescent; seeds lightly reticulated. Common east of the Cascades; Princeton; Armstrong. *G. incisum* Nutt. Stem glabrate, leaves short-strigose; flowers a little smaller. Rockies and northward.

4. *G. Richardsonii* F. & M. (WHITE G.) Stems solitary or several, 4-9 dm. high, leafless to the inflorescence, sparingly pubescent or glabrate, the hairs retrorse; leaves deeply 5-7-cleft, the divisions lobed and the lobes with a few coarse teeth, pubescent on the veins beneath; petioles slightly pubescent; petals white or heliotrope, pubescent at base; pedicels with spreading glandular pubescence; sepals oblong, short-hairy towards margins and on midrib, or glabrate on back; awn 3-4 mm. long; carpels glandular-pubescent; seeds reticulated. Crow's Nest Pass to Alaska and Queen Charlotte Islands.

5. *G. pusillum* L. (SMALL-FLOWERED G.) Pubescent, slender, weak, 1-5 dm. high; leaves orbicular, cleft $\frac{2}{3}$ of their diameter; petals small, rose, about equaling the awnless sepals; peduncles short, 6-18 mm. long, 2-flowered, anther-bearing stamens 5. Widely introd.

6. **G. molle** L. (DOVES-FOOT G.) Similar, more softly pubescent or villous; leaves cleft little beyond the middle; stamens 10; carpels transversely wrinkled. Widely introd.

7. **G. carolinianum** L. (CAROLINA G.) Stout, densely soft-pubescent, especially above; 1-4 dm. high; diffusely branched; leaves 5-9 lobed, the divisions cleft; flowers in compact clusters on short 2-flowered peduncles; petals equaling the awned sepals; carpels pubescent; beak of fruit tipped with a short style 2 mm. long. Comox; Victoria; Columbia Valley. Introd.

8. **G. Bicknellii** Brit. Annual or biennial, erect or ascending, the pubescence spreading; leaves deeply lobed and cleft; awns of sepals 2 mm. long; petals purple, equaling the sepals; fruit 1.5-2 cm. long; carpels pubescent; seeds lightly reticulated. V. I. to Rockies, and eastward.

9. **G. dissectum** L. (CUT-LEAVED G.) Annual or biennial, branching from base, ascending or spreading, pubescence of stem and petioles retrorse; leaves deeply cleft and lobed; awns of sepals 1 mm. long; petals purple, equaling the sepals; fruit 1.2-1.5 cm. long; seeds deeply pitted. Victoria; Nanaimo, and eastward.

2. ERODIUM (STORKSBILL)

Leaves pinnately parted, stamens 10, the 5 opposite the petals short and sterile or reduced to scales; the 5 perfect stamens with glands at base; styles at maturity twisted below. (Greek *erodios*, a heron).

1. **E. cicutarium** L. Her. Hairy, the many basal branches becoming prostrate; leaves opposite, pinnate, the divisions sessile, pinnatifid; flowers 2-8 in an umbel; sepals bristle-pointed; petals reddish; the tails of the carpels 2.5-4 cm. long. Introd. V. I.; becoming common everywhere.

LIMNANTHACEÆ

Glabrous annuals with alternate, pinnate, exstipulate leaves; petals 3-5, pale or yellowish; stamens twice as many, those opposite the petals usually shorter, hypogynous; ovary of 2-5 distinct 1-ovuled carpels, becoming rough nutlets; style 1.

1. LIMNANTHES

Low, calyx 4-5-parted; glands 5, alternating with the 4-5 persistent petals; stamens 8-10; style 4-5-lobed. (Greek *limne*, a lake, *anthos*, a flower).

1. **L. Douglasii** R. Br. About 1 dm. high, branching from the base; leaf-divisions entire or lobed; flowers 5-merous; sepals ovate, acute; petals about 12 mm. long, twice as long as the sepals, obovate, yellow at base with white, 2-lobed limb; stamens half as long as the petals; nutlets tuberculate. Ucluelet.

2. **L. Macounii** Trelease. Annual with light-green foliage, 2-8 cm. high; leaf-divisions entire or 3-lobed; flowers solitary, on stoutish, often radical peduncles, 4-merous; petals creamy, 3-4 mm. long, not longer than the lanceolate sepals, entire or erose; stamens half as long as the petals, nutlets very rough-tuberculate. Victoria, in wet or grassy places.

EUPHORBIACEÆ (SPURGE FAMILY)

Herbs with milky juice; apetalous and, in ours, asepalous flowers within a calyx-like involucre; ovary free, cells 3, styles 3.

1. EUPHORBIA (SPURGE)

Flowers in a small 4-5-lobed involucre (apparently a single flower); sterile flowers several, each of a single stamen in the axil of a minute bract, surrounding the solitary, exserted, pedicelled, fertile flower; styles 3, each 2-cleft; fruit separating into 3 carpels.

Plants erect, leaves symmetrical (Introd.)

Leaves orbicular below, ovate above 1. *E. peplus*.

Leaves linear-oblong below, fiddle-shaped above 2. *E. Lathyrus*.

Plants prostrate or spreading, leaves unsymmetrical at base. (Indigenous).

Seeds with sharp transverse wrinkles 3. *E. glyptosperma*.

Seeds slightly wrinkled, usually pitted 4. *E. serpyllifolia*.

1. *E. peplus* L. (PETTY SPURGE). Glabrous, branching from base, 2-3 dm. high; the branches 3-rayed above, and again forking; leaves entire; the glands of the involucre long-horned; seeds 2-grooved on the inner face, pitted on the back, about 1 mm. long. Gardens, Victoria; New Westminster.

2. *E. Lathyrus* L. (CAPER S.) Glabrous, branching from base, 2 dm. high or more, the branches 4-rayed above and again forking; leaves entire, the floral broadened at the somewhat cordate base; the glands of the involucre with 2 short horns; seeds usually wrinkled. Victoria.

3. *E. glyptosperma* Engelm. Prostrate or spreading, 1 dm. high, or less; leaves 1 cm. long or less, oblong, slightly falcate, very unsymmetrical at base (i. e. with a basal lobe), serrulate towards the apex; involucre 1-few in the forks of the branches, their glands with white appendages, seeds nearly 1.3 mm. long. Dry soil, Spence's Bridge; also in Alberta.

4. *E. serpyllifolia* Pers. Similar; prostrate-spreading, leaves obovate-oblong, narrow at the base, the basal lobe not so conspicuous, serrulate towards the apex, which is sometimes tinged red; seeds 1 mm. long. Dry soil, Penticton; Columbia Valley.

CALLITRICHACEÆ (WATER STARWORT FAMILY)

Slender, aquatic herbs with opposite, entire leaves and minute axillary sessile flowers; perianth none; flowers perfect or monœcious; usually enclosed between 2 bracts; stamen 1; styles 2, ovary 4-celled, obcordate, compressed.

1. CALLITRICHE (WATER STARWORT)

The only genus. (Greek *kalos*, beautiful, and *thrix*, hair, in allusion to the slender stems.)

Leaves 1-veined, none of them floating; flowers without bracts 1. *C. autumnalis*.

Leaves 3-veined, some of them floating; flowers usually with a pair of bracts.

Styles shorter than the ovary 2. *C. palustris*.

Styles longer than the ovary 3. *C. heterophylla*.

1. *C. autumnalis* L. Leaves submerged, uniformly linear; flowers bractless; fruit 2 mm. wide or more, circular, deeply notched, the carpels separate nearly to the axis, the lobes broadly winged. Kamloops; Gold Range.

2. *C. palustris* L. Floating leaves obovate less than 1 cm. long, crowded; fruit 1 mm. long, about as long as broad, obovate, usually thickest at base, its lobes sharply keeled or very narrowly winged above, with a wide groove

between them; stigmas usually deciduous. (*C. verna* L. in part). Atlantic to Pacific.

3. *C. heterophylla* Pursh. Floating leaves broadly spatulate, crowded, the immersed narrower, fruit obcordate, 1.5-2 mm. long, slightly longer than broad, decidedly thickest at base, its lobes rounded and grooved, with a small groove between them; styles from a little longer than, to 2 or 3 times as long as the fruit, slightly persistent. (*C. Bolanderi* Heg.) Common at the coast, V. I.; and eastward. *C. hamulata* Kutz., distinguished from this species by the very long divaricate styles and the bracts hooked at apex, occurs on V. I. and at Enderby.

ANACARDIACEÆ (SUMACH FAMILY)

Trees or shrubs with acrid or milky juice, compound, exstipulate leaves and small flowers in axillary or terminal panicles; flowers commonly polygamous or dioecious; calyx 5-7-parted; petals small, 5-7; stamens as many or twice as many; ovary superior, 1-celled, 1-ovuled, style 3.

1. RHUS (SUMACH)

Leaves trifoliate or pinnately compound, sepals and petals usually 5; stamens inserted with the petals under the edge of a disk that lines the calyx. (The ancient name).

Leaflets, 13 or more	1. <i>R. glabra</i> .
Leaflets, 3 or 5.	
Lateral leaflets short-petiolate	2. <i>R. Rydbergii</i> .
Lateral leaflets sessile	3. <i>R. diversiloba</i> .

1. *R. glabra* L. (SUMACH). A shrub 0.3-3 m. high, leaflets oblong, glaucous beneath, sessile, serrate, glabrous; inflorescence 1 dm. or more long, terminal, pubescent; petals oblong, greenish-yellow, hardly exceeding the calyx; fruit red, hirsute, not poisonous. The leaves turn brilliant scarlet in autumn. Princeton, and D. I.

2. *R. Rydbergii* Small. (POISON IVY). Stems erect, 6 dm. high or less, simple; leaflets ovate, acute or acuminate, more or less pubescent, entire, crenulate, or irregularly toothed, the lateral usually unsymmetrical at base, on petioles 3-4 mm. long; petals oblong, greenish-yellow, exceeding the sepals; fruit white, smooth, persistent. A poisonous plant. (*R. toxicodendron* in part). Princeton, eastward.

3. *R. diversiloba* T. & G. (POISON OAK). Stems pubescent, erect or climbing by rootlets, branching, 4 dm. or more high; leaves usually 3-foliate; leaflets ovate or obovate, obtuse or acutish, the margins entire, sinuate, toothed or 3-lobed, fruit white, deciduous. Rocky places, Saanich; Swan Lake, V. I.

EMPETRACEÆ (CROWBERRY FAMILY)

Low, evergreen, heath-like shrubs; flowers polygamous; petals none; pollen compound, stamens 2-4. Probably degenerate members of the *Eri-caceæ*.

EMPETRUM (CROWBERRY)

Flowers axillary, small, sepals 3, stamens 3; style short, stigma 6-9 rayed; fruit berry-like, with 6-9 nutlets. (Greek *en*, upon, and *petros*, a rock).

1. *E. nigrum* L. Procumbent or spreading; leaves linear-oblong, 4-5 mm. long, glabrous revolute; fruit black. Swamps and rocky banks. Atlantic to Pacific; Mts. opposite Vancouver City; Alaska.

CELASTRACEÆ

Shrubs with simple leaves and small, regular flowers in 1-few-flowered axillary cymes; stamens alternate with the petals, inserted on the margin of the broad disk; fruit 2-celled, free from the calyx, seeds arilled.

1. PACHYSTIMA

Low, evergreen shrubs; sepals, petals and stamens 4; seeds 1 or 2 enclosed in an oblong acute membranaceous aril. (Greek *pachys*, thick, and *stigma*).

1. *P. myrsinites* Raf. (FALSE BOX). Densely branched 5-8 dm. high; leaves 10-30 mm. long, ovate to oblong, mostly cuneate at base, serrate towards apex; petals reddish or pale. Rocky places V. I. to Rockies and on mts. up to 7,000 ft. Several segregates have been proposed.

ACERACEÆ (MAPLE FAMILY)

Trees or shrubs with opposite leaves, mostly palmately lobed, and small, regular, polygamous or dioecious flowers; ovary 2-celled, 2-lobed, with 2 ovules in each cell.

1. ACER (MAPLE)

Flowers polygamo-dioecious; calyx colored, 5-lobed or parted; stamens 3-12 inserted on an hypogynous disk; styles usually 2-lobed; fruit a samara with 2, not rarely 3, wings. (The classical name, from Celtic *ac*, hard).

Flowers in long, drooping racemes, fruit hispid	1. <i>A. macrophyllum</i> .
Flowers in small, corymbose racemes, fruit glabrous or nearly so.	
Leaves 3-5 lobed, petals and sepals alike	2. <i>A. glabrum</i> .
Leaves 7-9 lobed, petals white	3. <i>A. circinatum</i> .

1. *A. macrophyllum* Pursh. (BROAD-LEAVED M.) Tree 20-30 m. high; leaves 1.5-3 dm. broad, cordate, deeply 5-lobed, the sinuses rounded; flowers appearing just before the leaves; sepals and petals about equal, greenish yellow; wings of samara 5-7 cm. long, making angles of 70°-90° with each other. V. I. and west of the Cascades.

2. *A. glabrum* Torr. (SMOOTH, OR ROCKY MT. M.) A small tree, or in clumps, 3-10 m. high; leaves long petioled, glabrous, 3-5 lobed, the sinuses acute, the lobes sharply serrate; flowers appearing with the leaves, 2-3 weeks earlier than those of No. 3., short-pedicelled, erect; petals and sepals alike, light-yellow; stamens shorter than the petals; the wings of the samara hardly spreading. Common east of the Cascades, and sparingly at the coast, and on V. I. (*A. Douglasii* Hook).

3. *A. circinatum* Pursh. (VINE M.) Usually in clumps, 3-10 m. high, often declined, twigs red or green, the flowers appearing with the leaves; leaves short petioled, villous beneath, the rather short lobes sharply serrate; sepals red, villous; petals white, broadly ovate, with an acute, hooded apex; fertile stamens exserted; the stamens of the pistillate flowers short and abortive; wings of samara forming an angle of 180° with each other. West of Cascades. Var. *fulva*. Twigs and sepals yellowish; petals not so neatly cucullately pointed as in the species. Stanley Park, Vancouver. *A. Macounii* Greene. Leaves glabrous with 5 radiating lobes (not pointing towards apex as in species). Chilliwack Lake. Only one tree known.

RHAMNACEÆ (BUCKTHORN FAMILY)

Shrubs or small trees with simple, alternate leaves and small, regular, dioecious, monoecious or polygamous flowers; stamens perigynous, 4 or 5, opposite to and enclosed by the hooded or concave petals, inserted on the edge of a fleshy disk lining the short calyx-tube; ovary 2-5 celled, free from or sometimes cohering with the disk.

Petals short clawed, ovary free, fruit a drupe 1. *Rhamnus*.
 Petals long clawed, calyx adherent to base of ovary, fruit dry 2. *Ceanothus*.

1. RHAMNUS (BUCKTHORN)

Shrubs or small trees; flowers solitary or in small umbels; petals small or none, notched; drupe black, 2-4-seeded. (The Greek name).

Small tree, petals present 1. *R. Purshiana*.
 Low shrub, petals wanting 2. *R. alnifolia*.

1. *R. Purshiana* D.C. (CASCARA SAGRADA). A tree 7-14 m. high; leaves oblong-elliptical to obovate, rounded or subcordate at base, denticulate, pubescent beneath with prominent ribs; nutlets and seeds convex on the back. Woods west of Cascades, and V. I.

2. *R. alnifolia* L'Her. A shrub 0.5-1 m. high; leaves elliptical, acute at both ends, crenate-serrate, glabrous except the petioles; nutlets and seeds deeply grooved on the back. Swamps, Cranbrook.

2. CEANOTHUS (SNOWBRUSH)

Shrubs with opposite or, in ours, alternate leaves, and small white flowers in showy panicles; petals 5, hooded, tapering to a narrow claw; style short, 3-lobed; ovary somewhat 3-lobed, separating at maturity into 3 nutlets. (Greek *keanothos*, a thistle, from the thorns of some species).

Leaves evergreen, thick, shining above, finely serrate 1. *C. velutinus*.
 Leaves deciduous, thin, serrate 2. *C. sanguineus*.

1. *C. velutinus* Dougl. In dense, low clumps, or matted, 1 m. high, or less, branches green; leaves elliptical, rounded at base, glandular toothed, very strongly 3-nerved, pale and densely velvety-pubescent beneath, shining and glutinous above, on short, stout petioles. Lytton, Columbia Valley. Crow's Nest Pass. Var. *laevigatus* T. & G. Leaves green and glabrous beneath; becoming a small tree 5 m. high at Cameron Lake, V. I.; Rockies.

2. *C. sanguineus* Pursh. Shrub, 1-2 m. high, branches reddish; leaves elliptical-ovate, subcordate, more coarsely serrate, sparingly pubescent beneath, on short, slender pedicels. Cascade Valleys; Princeton; Nelson; Rossland; also on V. I.

BALSAMINACEÆ (BALSAM FAMILY)

Succulent herbs with simple exstipulate leaves and irregular flowers, the posterior sepal colored and inflexed to form a spurred sac; stamens and stigmas 5; ovary 5-celled.

1. IMPATIENS (JEWELWEED)

Annuals; sepals apparently 4 (the notch in the anterior indicating the union of 2) petals apparently 2 (their 2 lobes indicating the union); the 5 filaments more or less united above; pods bursting suddenly when touched (whence the name).

Saccate sepal spurred 1. *I. biflora*.
 Saccate sepal spotted, orange 2. *I. occidentalis*.
 Saccate sepal not spotted, pale-yellow 3. *I. ecalcarata*.
 Saccate sepal not spurred

1. *I. biflora* Watt. Stem 6-12 dm. high; leaves oval or ovate, often purplish, coarsely serrate; flowers 3-6; spurred sepal orange, usually well dotted with reddish spots, 15-20 mm. long; at least $\frac{2}{3}$ as broad as long, abruptly contracted into a curved spur half as long. Alaska to Washington. Hope.

2. *I. occidentalis* Rydb. Similar; leaves green; spurred sepal pale-yellow, unspotted, or with minute dots, about 2 cm. long, one-half as broad as long, gradually tapering into a curved spur nearly half as long. Alberta to Washington. (*I. pallida* Hook. in part). *I. aurella* Rydb. Flower smaller, golden yellow. S. E. Kootenay.

3. *I. ecalcarata* Blank. Light-green, 1 m. high, leaves usually acute at both ends; saccate sepal not spurred, orange or pale-yellow, unspotted, 1 cm. long, a little broader than long. Southeastern British Columbia.

MALVACEÆ (MALLOW FAMILY)

Herbs with alternate, stipulate leaves and perfect, regular flowers; the numerous stamens united by their filaments, and somewhat united at base with the corolla; anthers kidney-shaped, 1-celled; sepals persistent, united at base, often with a whorl of bractlets forming an involucre; carpels several to many, their bases united in a ring, and separating at maturity.

Stigma capitate.

Carpels 1-seeded, leaves deeply lobed 1. Malvastrum.

Carpels 1-3 seeded, leaves not very deeply lobed 2. Sphæralcea.

Stigmas linear; carpels 1-seeded.

Involucral bracts 3; stamens united in 1 series (simply monodelphous). 3. Malva.

Involucral bracts none; stamens united in 2 series (the tube double at the top); plants taller, 6-9 dm. high 4. Sidalcea.

1. MALVASTRUM (FALSE MALLOW)

Herbs with dense, stellate pubescence and (in ours) deeply lobed leaves; flowers in a short terminal raceme with short pedicels; carpels 10 or more, each filled by the solitary seed; involucre none or of 1-3 bracts (*Malva* and *aster*, a star).

1. *M. coccineum* Gray. Canescent, 1-2 dm. high; palmately 3-5-parted, the divisions oblong and entire; petals copper-colored or dull-scarlet, 2-3 times longer than the densely stellate calyx. Kamloops; Alberta.

2. SPHÆRALCEA (GLOBE MALLOW)

Perennials with showy flowers; involucral bracts 3, setaceous, often deciduous; ovules 1-3 in each carpel; fruit conical; carpels 2-valved. In ours the inflorescence is long and open, and the leaves not lobed beyond the middle. (Greek *sphaira*, a sphere, *alkea*, a mallow, in allusion to the fruit).

1. *S. Monroana* Spach. Plant 3-6 dm. high; leaves 3-4 cm. long, densely stellately canescent, ovate, lobed and crenate; petals about 15 mm. long; scarlet; carpels pubescent, reticulated below. Gravelly soil, Osoyoos.

2. *S. rivularis* Torr. (MOUNTAIN HOLLYHOCK). Tall, 6-12 dm. high, leaves sparingly stellate-pubescent, not canescent, maple-like, 5-7 lobed, coarsely serrate, 1 dm. or more long; petals 1.5-2 cm. long, pink; carpels hirsute, hardly reticulated below. Banks and along streams; Nelson; Rossland; Vernon.

3. MALVA (MALLOW)

Herbs with lobed leaves and large obcordate petals; pubescence simple or stellate; fruit separating at maturity into indehiscent, 1-seeded, flat carpels. In the 3 following introduced species, the calyx encloses the fruit. (Greek *malache*, soft, in allusion to the leaves).

Flowers white, large 1. *M. moschatus*.
 Flowers small.

Carpels smooth on the back 2. *M. rotundifolia*
 Carpels reticulated or transversely wrinkled on the back 3. *M. borealis*.

1. *M. moschatus* L. (MUSK M.) Perennial, erect; leaves orbicular, deeply lobed, or the lower merely lobed; flowers somewhat crowded at the ends of the branches, the usually white petals strongly veined, 2 cm. long; carpels very hairy. V. I.; New Westminster, etc.

2. *M. rotundifolia* L. (COMMON M.; CHEESES). Annual or biennial, procumbent; leaves round-cordate crenate obscurely lobed; flowers clustered in the axils; petals whitish or bluish, 2-3 times as long as the sepals; carpels pubescent. Waste places and gardens, Victoria; Okanagan Valley.

3. *M. borealis* Wallm. Annual or biennial, procumbent, stellately as well as simply pubescent; leaves 5-lobed, crenate, the petioles pubescent; flowers clustered or solitary in the axils; petals whitish or pinkish, hardly exceeding the calyx; carpels pubescent, the edges rough, angled. Nanaimo; Elgin; not common.

4. SIDALCEA (MARSH HOLLYHOCK)

Herbs, the lower leaves large, round, lobed; the upper deeply lobed; flowers purplish or rose in a terminal raceme; stamen-tubes double at the top, the outer stamens in 5 sets; carpels 5-9, 1-seeded, sometimes beaked. (*Sida*, a genus of this family, *alkea*, a mallow).

1. *S. Hendersoni* L. Wats. Nearly glabrous or with a few forked hairs, 6-9 dm. high; the lowest leaves lightly lobed, or some of them cleft to the middle; the upper 3-5 parted; racemes usually long, corolla red; flowers of 3 kinds, (a) perfect, 1.5-2 cm. long; (b) perfect, about 1 cm. long; (c) imperfect, anthers wanting, about 1 cm. long; pedicels short, glabrous; calyx-lobes ovate, short-acuminate, slightly ciliate; carpels smooth with a linear beak. Common; marshes, Lower Fraser. Victoria specimens are more pubescent, often with a short raceme, but apparently also belong here.

HYPERICACEÆ (ST. JOHN'S WORT FAMILY)

Herbs with opposite, entire, dotted leaves and perigynous flowers; sepals and petals 4 or 5; stamens many, often in 3-5 clusters; pod 1-celled, with as many styles as parietal placentæ or 3-celled.

1. HYPERICUM

Petals 5, yellow, convolute in the bud; sepals 5; stamens in 3-5 clusters; styles 3; pod 1-celled or 3-celled by the intrusion of the placentæ. (The ancient name).

Low plants; styles short 1. *H. anagalloides*.
 Tall plants; styles long.

Sepals acuminate, lanceolate 2. *H. perforatum*.
 Sepals obtuse, oblong-elliptical 3. *H. Scouleri*.

1. *H. anagalloides* C. & S. Low, hardly 1 dm. high, usually in mats; leaves ovate-oblong, hardly 1 cm. long; flowers 6-10 mm. broad, orange, in a few-flowered cyme; capsule 1-celled. Wet places, common. The alpine and northern form with solitary flowers and more crowded leaves has been distinguished as *H. bryophytum* Greene.

2. *H. perforatum* L. (COMMON ST. JOHN'S W.) Tall, branching, 6 dm. high; leaves elliptical-oblong, with pellucid dots and usually black dots; petals 1 cm. long, with black dots; flowers in broad cymes; capsule 3-celled; slightly 3-lobed. Common about New Westminster and Victoria. Introd.

3. *H. Scouleri* Hook. Similar; stem simple or sparingly branched; leaves with pellucid dots, more or less clasping, usually black-dotted along the margins; flowers paniced; capsule 3-celled and 3-lobed; petals 10-14 mm. long. Dry soil, Victoria; Okanagan Valley; Bonnington Falls.

VIOLACEÆ (VIOLET FAMILY)

Herbs with irregular corollas and 5 hypogynous stamens embracing the club-shaped or beaked style; pod 1-celled with 3 parietal placentæ.

VIOLA (VIOLET)

The lower petal spurred, the spur receiving nectariferous projections from the two lower stamens. Besides the conspicuous flowers which appear in spring, there are often produced later inconspicuous, bud-like, cleistogamous flowers that are often more fruitful than the ordinary blossoms. (The Latin name; generally mispronounced; the accent should be on the first syllable).

Acaulescent.

Flowers white, 6-12 mm. long.

Rootstock stout, scaly, erect

Rootstock mostly slender, horizontal, exc. in No. 2.

1. *V. mistassinica*.

Runners very slender, or usually wanting in No. 2; plants often slightly pubescent; flowers 6-10 mm. long; veins of lower petals many, broad.

Leaves strongly reniform

2. *V. renifolia*.

Leaves round-reniform, mostly rounded at apex; pubescence, if any, soft

3. *V. macloskeyi*.

Leaves cordate, mostly pointed at apex; the peduncles of the cleistogamous flowers often producing short, stiff hairs

4. *V. pallens*.

Runners not very slender; plants strictly glabrous; flowers 10-12 mm. long; veins of lower petal few, narrow

5. *V. palustris*.

Flowers pale-lilac to white, often larger.

Leaves minutely hairy above, spur 4-5 mm. long

6. *V. selkirkii*.

Leaves glabrous, spur shorter

5. *V. palustris*.

Flowers blue or violet.

Petals roundish, all glabrous, petioles 3 cm. long or less

7. *V. cyclophylla*.

Petals not roundish, at least the lateral bearded, petioles much longer.

Style notched at apex, beaked.

Leaves pubescent beneath

8. *V. septentrionalis*.

Leaves glabrous.

9. *V. nephrophylla*.

Style rounded at apex, beaked

10. *V. Langsdorfii*.

Caulescent.

Flowers yellow.

Leaves evergreen, stems prostrate

11. *V. sempervirens*.

Leaves not evergreen, stems erect or ascending.

Leaves ovate to oblong-lanceolate

12. *V. Nuttallii*.

Leaves reniform-cordate

13. *V. glabella*.

Flowers not yellow.

Flowers whitish, tinged with purple; stipules entire

14. *V. canadensis*.

Flowers blue; stipules more or less toothed.

Plants glabrous.

Rootstock horizontal; spur 2-3 mm. long

10. *V. Langsdorfii*.

Rootstock erect, woody; spur longer

16. *V. adunca* var. *glabra*.

Plants not glabrous.

Leaves strongly cordate, reniform to broadly ovate; sepals often ciliate

15. *V. Howellii*.

Leaves not usually strongly cordate, ovate to ovate-oblong; sepals not ciliate.

Flowers usually exceeding the leaves; spur 4-7 mm. long, petals pale or pinkish-purple at base

16. *V. adunca*.

Flowers not exceeding the leaves, spur 4-5 mm. long, petals yellowish-white at base

17. *V. montanensis*.

1. *V. mistassinica* Greene. Glabrous or pubescent at the top of the petioles and on the mid-vein beneath; rootstock clothed with the persistent, scaly bases of the leaves; leaves round-reniform, cordate, obtuse or with a short, salient cusp; the margin dentate or crenate, rather more strongly dentate on the lobes; petals all glabrous, the lowest purple-veined, with the purple color diffused over the whole petal. Field, Emerald Lake (Miss Farr); Lake Louise.

2. *V. renifolia* Gray var. *Brainerdii* Fernald. Leaves reniform, sometimes pointed, crenate-serrate, sinus shallow or well-marked, more or less

pubescent, but often glabrous above; upper petals obovate, the lateral often broader, beardless, the lower many-veined; seeds 1.5 mm. long, brown. Apparently differing from the other white violets in the more erect rootstock, which seldom produces runners. B.C. to Atlantic; Golden (R. Landells).

3. **V. Macloskeyi** Lloyd. Glabrous (typically) or slightly pubescent with soft hairs; leaves reniform, often short-pointed, the sinus shallow, the lamina slightly decurrent down the slender petiole, the margin crenate-serrate, typically obscurely so; petals very thin, translucent, the spur very short; the lateral petals bearded. Differing from the eastern *V. blanda* (which has oblong upper petals) in the size and character of the spur and in the translucent petals. Damp, mossy places; V. I. to Nevada; Cameron Lake; Golden. The Cameron Lake plants have ellipsoidal pods 5-6 mm. long, and black seeds about 1.2 mm. long, which are rather thicker than the brown seeds of No. 4.

4. **V. pallens** (Banks) Brainerd. Glabrous, or the petioles, peduncles and under surface of the leaves finally producing short, stiff hairs; leaves 1-2 cm. broad, usually with a marked sinus, round to cordate, usually pointed, crenate-serrate; petals thin, often greenish at base, the upper oblong-obovate, the lateral usually beardless; lower petal 6-9 mm. long, the veins many, their color sometimes diffused over the petal; capsules ellipsoidal about 6 mm. long; seeds about 1.2 mm. long, black (typically) but in the Vancouver plants brown. Damp, mossy places; Atlantic to Pacific; Skeena Valley.

5. **V. palustris** L. Glabrous from rather slender, jointed rootstocks; stoloniferous; leaves firm, round-ovate-cordate or reniform, sinus open, rounded; peduncles shorter than or exceeding the leaves; flowers 8-11 mm. long, lilac or white, the lateral petals purple-veined, often beardless, the spurred petal sometimes notched; spur not longer than thick; sepals ovate, acute or obtusish, scarious-margined, style obliquely flattened at apex and beaked. Wet ground, Atlantic to Pacific; occurring with us in the mts. Var. **leimonia** V. N. Larger in every way; flowers 12-20 mm. long, white, or if mauve, lighter in color than in the species, the spurred petal often bluntly pointed; pods 9-12 mm. long, oblong; seeds olive or black, hardly 1.5 mm. long. Wet ground, V. I.; Lower Fraser Valley.

6. **V. selkirkii** Pursh. (GREAT-SPURRED V.) Small and delicate with underground runners; leaves round-cordate, with a closed sinus, 2-4 cm. wide, minutely pubescent on the upper face, the plant otherwise glabrous; peduncles equaling the leaves; petals all beardless, pale-lilac; style as in *V. palustris*, somewhat peltate-flattened, obliquely beaked; capsule subglobose, dotted purple, seeds small, straw-colored. Selkirks, eastw; rare; Golden (?).

7. **V. cyclophylla** Greene. Glabrous, the tufted leaves and flowers terminating a horizontal scaly caudex; leaves orbicular, about 2.5 cm. wide, cordate, the sinus nearly or quite closed, on petioles 2.5 cm. long or a little more; peduncles stout, twice as long as the leaves; bracteate far above the middle; sepals lanceolate, thin, nerveless, scarious-margined; corolla blue, about 17 mm. broad, somewhat orbicular, all the petals extremely broad, rounded, round-obovate, all glabrous. Yellow-Head Pass.

8. **V. septentrionalis** Greene. Rootstock fleshy, without runners; leaves 3-7 cm. wide, hirsutulous on petioles and lower surface, somewhat pointed, but the apex blunt; peduncles slender, wiry; petals deep-violet to pale lilac, all occasionally bearing scattered hairs; spurred petal villous; sepals ovate, usually obtuse, closely ciliate; cleistogamous flowers sagittate on horizontal or recurved peduncles; capsules purple or green, subglobose, 5-8 mm. long, seeds brown. (*V. cuspidata* Greene). Pend Oreille River; Cascade; also in eastern America.

9. **V. nephrophylla** Greene. Glabrous, leaves ovate-cordate to reniform, pointed, serrate, stipules small; peduncles 5-15 cm. high; sepals obtuse, scarious-margined, 3-nerved; flowers 12-21 mm. long, deep-violet with light-

colored base, the 3 lower petals more or less bearded; spur hardly 3 mm. long, light-purple; style notched at apex, with a short beak; cleistogamous flowers on peduncles 2-6 cm. long. East of Cascades; Armstrong. Fruiting specimens collected at Revelstoke with slightly fleshy round-reniform, crenate-serrate, very obtuse leaves and purple-spotted pods, may be *V. cognata* Greene, a species often reduced to synonymy.

10. *V. Langsdorffii* Fisch. Glabrous from a rather stout, superficial, horizontal rootstock, stemless or with a stem 3 cm. long or less; stoloniferous; leaves firm, round-reniform with a broad, open sinus, or cordate; stipules 8-20 cm. long, toothed or nearly entire, style small, rounded at apex and beaked; flowers 1.5-2 cm. long, dark-blue, with short, white spur; lateral petals bearded, sepals acute. Margin Shawnigan Lake; Ucluelet, V. I.; Alaska.

11. *V. sempervirens* Greene. Low, usually matted, producing leafy runners; glabrous or with a few short hairs on the upper surface of the leaves; leaves coriaceous, evergreen, rounded or distinctly pointed at apex, round-cordate or ovate, with an open sinus, 1-3 cm. broad, often punctate, on petioles 2-3 times as long; the peduncles slightly longer than the leaves; flowers about 1 cm. long, the lower petals brown-veined, the lateral with a bunch of clavate scales; stigma not beaked, glabrous or slightly hairy; spur short; capsule purple-marked; seeds ovoid, white. Dry woods V. I.; Vancouver; Revelstoke. Var. *orbiculata* (Geyer). Leaves round-reniform with a narrow sinus, the leafy runners, if any, producing only cleistogamous flowers. Mts.; Rockies.

12. *V. Nuttallii* Pursh. Pubescent to nearly glabrous, short-stemmed, erect or spreading; leaves glabrate, ciliate-margined, lanceolate, obtuse, entire to repand-denticulate or irregularly crenate, tapering to a margined petiole; peduncles equaling or shorter than the leaves; flowers 10-12 mm. long; petals faintly veined with purple, or sometimes brown-purple within; style at apex rounded, hairy, not beaked; spur short; cleistogamous flowers on short peduncles; capsule subglobose. Sask. to Wn. The V. I. form is var. *præmorsa* Wats. Leaf-blades ovate to lanceolate-oblong, rounded or truncate or slightly acute at base, entire, repand or slightly irregularly and distantly crenate-dentate; the whole plant usually rough-pubescent; seeds large; flowers 12-15 mm. long. Grassy places Victoria. Var. *linguæfolia* Nutt. Leaves oblanceolate, decurrent on the petioles, ciliate-margined, obscurely denticulate, long-petioled, but exceeded by the peduncles. Sub-caulescent, more erect than the preceding. Rockies.

13. *V. glabella* Nutt. Pubescent to glabrous; stems 2-3-leaves at summit, 1-3 dm. high from a stout, horizontal rootstock; leaves broadly ovate, cordate, with a short acute apex, crenate-serrate, 3-8 cm. wide; upper stipules ovate; flowers 8-14 mm. long, spur short; apex of style slightly bearded, not beaked; capsule oblong, seeds olive. Damp soil and along streams. Common at the coast, and in the mts.; Selkirks.

14. *V. canadensis* L. Similar in general appearance; slightly pubescent to glabrate; stems 2-3-leaved at summit and usually with 1 or 2 below, usually a flower in each axil; leaves reniform-cordate or the upper truncate at base, all with a prominent, mostly abruptly acuminate apex, crenate-serrate; stipules lanceolate, scarious; peduncles very slender; petals tinged with violet; sepals narrowly lanceolate; style capitate, beakless, bearded; capsule subglobose, often pubescent. East of the Cascades. Var. *Rydbergii* (Greene) House. Scabro-puberulent on the veins and leaf margins. The common form. Coast to Rockies.

15. *V. Howellii* Gray. From 1-2.5 dm. high, from a strong, vertical root; in summer producing long runners; petioles and peduncles puberulent to glabrate; stipules incisely serrate or entire; leaves thinnish, crenate, 2.5-5.5 cm. broad, broadly cordate or some of them reniform; pubescence sparse to rather plentiful, especially on the lobes below, the margin usually ciliate;

flowers blue, 15-25 mm. long, usually not exceeding the leaves; sepals often ciliate; stigma with a few hairs; seeds brownish-white, 2.3 mm. long. Open woods and bluffs, Nanaimo; Shawnigan; Victoria. Dr. Greene describes some closely related species in *Pittonia* iv.

16. **V. adunca** Smith. Rootstock woody; stems 1-20 cm. long, the peduncles usually exceeding the leaves, their bracts above the middle often near the flower; plant more or less puberulent, often with short, retrorse hairs on petioles and peduncles; stipules with narrow teeth, leaf-blades ovate to ovate-oblong, sometimes round, obtuse or bluntly pointed, cordate to rounded or truncate at base or even slightly decurrent on petiole, crenate or crenate-serrate, 1-3.5 cm. long; sepals lanceolate; flowers 10 to 20 or even 25 mm. long, dark-blue or sometimes light-blue, often with pale base; petals obovate, the lateral (or rarely all) strongly bearded; spur rather slender to stout, often curved, often with callosities or a tooth-pointed apex, 4-7 mm. long; seeds 1.3-2 mm. long. (*V. adunca* var. *longpipes*). Common and widely diffused, V. I. to Rockies. Dr. Greene has proposed many closely related species based upon the stout spurs, large flowers and varying habit of V. I. forms, which apparently do not reach specific rank. Straight and curved spurs or slender and stout spurs may occur on the same plant. The brown spots often found on the leaves of herbarium specimens are the result of slow drying. Var. **glabra** Brainerd. Plant glabrous. Common in the Rockies.

17. **V. montanensis** Rydb. Rootstock woody; stems 7-20 cm. long, the slender peduncles 2-8 cm. long, usually not exceeding the leaves, their bracts often near the flower; whole plant puberulent, the short dense hairs retrorse on the slender petioles and peduncles; stipules entire or with narrow teeth; leaf-blades broadly ovate, often cordate or subcordate, 2-5 cm. long, more or less distinctly crenate; sepals narrowly lanceolate, obtuse or bluntly pointed; flowers 10-20 mm. long, blue with a yellowish-white base and spur; petals rather narrow, the lateral slightly bearded; spur straight or slightly curved, 4-5 mm. long; pod 5-10 mm. long; seeds brown, 2 mm. long. (*V. retroscabra* Greene). Kootenay; Bonnington Falls; Creston.

LOASACEÆ (LOASA FAMILY)

Herbs with scabrous leaves and small or large yellow flowers; ovary inferior, 1-celled, with 3 parietal placentæ; calyx 5-lobed; petals 5 or 10; stamens many.

1. MENTZELIA (STICK-LEAF)

Stems usually white and shining; flowers cymose or solitary; the outer filaments often petaloid, but filiform in ours; the stamens inserted below the petals on the throat of the corolla, style 3-cleft; capsule long, angled or cylindrical. (Mentzel was an early German botanist).

Flowers large, petals 3 cm. long 1. *M. lævicaulis*.

Flowers small, petals 3-5 mm. long. 2. *M. albicaulis*.

Seeds not grooved on the angles, leaves pinnatifid to entire 3. *M. integrifolia*.

1. **M. lævicaulis** T. & G. Stout, 6 dm. high; leaves coarsely sinuate-dentate, lanceolate; capsule clavate, 3 cm. long; seeds minutely tuberculate, winged. D. I.; Kamloops; Princeton.

2. **M. albicaulis** Dougl. Branching from the base, 2-4 dm. high; the upper leaves often entire, some or all of the lower pinnatifid; flowers 7-9 mm. broad, petals brownish at base; capsule about 2 cm. long, clavate; seeds obtusely angled. Dry plains east of the Cascades.

3. **M. integrifolia** (Wats.) Rydb. Stems usually spiculate; leaves entire or denticulate, narrowly oblong or sometimes ovate; capsule hardly clavate, about 1.5 cm. long; seeds tuberculate, grooved on the angles. Princeton; Summerland.

CACTACEÆ (CACTUS FAMILY)

Stems fleshy, with leaves reduced to scales, and spines arising from cushions of minute bristles; flowers large, solitary; stamens many, cohering more or less with the numerous sepals and petals; ovary coherent with the calyx-tube, 1-celled with several placentæ; styles united, stigmas equaling the placentæ.

1. OPUNTIA (CACTUS)

Stems with flat or terete joints; the small, subulate leaves early deciduous; the flowers arising between the joints; calyx-tube not prolonged beyond the ovary, its lobes spreading; stigmas 2-8; fruit usually spiny. (An old name).

1. *O. polyacantha* Haw. Prostrate, in masses, the joints of the stem flattened, orbicular, 4-10 cm. long, the bristles reddish; spines 8-15, very unequal; flowers yellow; stigmas 5-8; fruit dry, spiny; seeds 5-6 mm. broad. Var. *borealis* Seeds 4 mm. broad. Spence's Bridge; Nanaimo; Islands, Gulf of Georgia.

2. *O. fragilis* Haw. Subdecumbent, the joints ovoid, subterete (the fruit-bearing ones compressed), 2-4 cm. long; cushions at base of spines white; spines usually 4, one of them much longer, with several minute ones at base; flowers yellow; fruit almost naked; seeds 6 mm. broad. D. I.

ELÆAGNACEÆ (OLEASTER FAMILY)

Shrubs, the entire leaves silvery beneath with dense stellate pubescence; flowers perfect, polygamous or dioecious, in axillary clusters on the old wood; calyx 4-lobed, the tube becoming berry-like and enclosing the achene.

Flowers perfect, 1 cm. long; stamens 4; leaves alternate 1. *Elæagnus*.
Flowers dioecious, 3-4 mm. long; stamens 8; leaves opposite 2. *Shepherdia*.

1. *Elæagnus argentea* Pursh. (SILVERBERRY). Shrub, 2-4 m. high; the young twigs ferruginous; leaves elliptical to ovate, silvery scurfy, especially beneath, 4-9 cm. long; flowers in the axils of the leaves, deflexed, silvery without, yellow within, very fragrant; fruit dry and mealy, edible. Dry slopes; Golden; Spence's Bridge; Alaska.

2. *Shepherdia canadensis* Nutt. (SOOPOLALLIE). A thornless shrub, 1-2 m. high, the young twigs brown scurfy; leaves elliptical or somewhat ovate, 1.5-5 cm. long, green above, covered with rusty scales beneath; flowers appearing with the leaves, yellow, fascicled in their axils; fruit scarlet or yellow, rather unpleasant to the Caucasian taste, but when beaten up with sugar a delicacy with the Indians. V. I.; D. I.; Alaska.

LYTHRACEÆ (LOOSESTRIFE FAMILY)

Herbs with opposite, entire, exstipulate leaves and axillary flowers, the calyx enclosing, but free from, the 1-4 celled ovary; petals 4-7, stamens 4-14 on the throat of the calyx; style 1, stigma capitate. Flowers dimorphous as to styles and stamens.

1. LYTHRUM (LOOSESTRIFE)

Calyx cylindrical, 5-7-toothed, appendaged in the sinuses; stamens usually about 6 or 12 and petals 6; capsule 2-celled; flowers red. (Greek *lythron*, blood, probably in allusion to medicinal properties).

1. *L. alatum* Pursh. Glabrous, the stem angled and slightly winged, 3-5 dm. high; leaves oblong-ovate to lanceolate; flowers 6-8 mm. broad, nearly sessile in the upper axils; stamens of the short-styled flowers exerted. Griffin Lake; Ontario.

2. *L. Salicaria* L. (PURPLE LOOSESTRIFE). Pubescent, stamens 12, petals 6; flowers in a long interrupted spike. Collected in Vancouver some years ago; not seen recently; not indigenous.

HALORAGIDACEÆ (WATER MILFOIL FAMILY)

Aquatic or marsh plants with small, perfect, or unisexual flowers in the axils of the leaves; petals small or none; stamens 1-8; calyx-tube adnate to the ovary, its limb entire or 4-lobed; fruit a nutlet of 1-4 carpels.

Leaves entire; petals wanting; stamen and style 1	1. Hippuris.
Leaves dissected; flowers 4-merous	2. Myriophyllum.

HIPPURIS (BOTTLE BRUSH)

Stems simple, erect; the simple leaves in whorls; flowers perfect or polygamous; calyx limb minute, entire; style filiform, lying in a groove of the anther. (Greek *hippos*, a horse, *oura*, a tail; Mare's Tail is a common name for the plant).

Leaves linear or lanceolate.	
Leaves in whorls of 5-12	1. <i>H. vulgaris</i> .
Leaves in whorls of 5-6	2. <i>H. montana</i> .
Leaves oblanceolate, in whorls of 4-6	3. <i>H. tetraphylla</i> .

1. *H. vulgaris* L. Two-4 dm. high; leaves 2-3 cm. long, or more, the submersed leaves often much longer. Widely diffused; Cranbrook.

2. *H. montana* Ledeb. Low, 0.5-1 dm. high; leaves mucronate, 8-12 mm. long; flowers often monœcious; fruit minutely granulate. Alaska to Washington; Selkirks; Strathcona Park; V. I.

3. *H. tetraphylla* L. Smaller, 1-3 dm. high; leaves oval to obovate or oblanceolate. Quebec to Alaska.

2. MYRIOPHYLLUM (WATER MILFOIL)

The immersed leaves finely pinnately dissected, in whorls of 3-6; the aerial entire to pinnatifid; flowers usually above water, the upper staminate, the lower fertile, the intermediate often perfect; calyx 4-parted in the sterile flowers, 4-toothed in the others; petals minute or wanting; stamens 8 (in ours); styles 4; fruit of 4 nutlets. (Greek *myrioi*, numberless, *phyllon*, a leaf).

1. *M. spicatum* L. Stems long and slender; the floral leaves ovate, entire or serrate, much reduced above, shorter than the whorled flowers. Kamloops Lake; Sproat Lake.

2. *M. verticillatum* L. Floral leaves pectinately-pinnatifid, much longer than the flowers. Also attributed to British Columbia.

ONAGRACEÆ (EVENING PRIMROSE FAMILY)

Herbs, flowers 4-merous (or 2-merous); ovary 2-4 celled, inferior, surmounted by the calyx-lobes; stamens as many or twice as many as the petals; stigma entire, or 4-lobed; pollen grains often cobwebby; leaves opposite or alternate, without stipules.

Petals usually none (or 4, small, red) stamens 4; aquatic	1. <i>Ludvigia</i> .
Petals 2, stamens 2, leaves opposite	2. <i>Circæa</i> .
Petals 4, stamens 8.	
Seeds silky-tufted	3. <i>Epilobium</i> .
Seeds not silky-tufted, leaves alternate.	
Anthers attached near the middle, petals often yellow or white.	
Stamens 4 long and 4 short, ovary 2-celled	4. <i>Gayophytum</i> .
Stamens of equal length, ovary 4-celled	5. <i>Oenothera</i> .
Anthers attached at the base, petals not yellow.	
Calyx-lobes erect, petals 2-lobed	6. <i>Boisduvalia</i> .
Calyx-lobes reflexed.	
Petals sessile, entire	7. <i>Godetia</i> .
Petals clawed, 3-lobed	8. <i>Clarkia</i> .

1. LUDVIGIA

Aquatic perennials with small sessile flowers in the axils; calyx-lobes 4, with no tube above the ovary, capsule short. (Ludwig was a German botanist).

1. *L. palustris* Ell. (WATER PURSLANE). Glabrous; stems creeping, 1 dm. or so long; leaves opposite, ovate or oval, 1-2 cm. long, tapering into a short petiole; calyx-lobes very short. In mud or shallow water, Burnaby Lake; Sproat Lake, V. I.; Sask.

2. CIRCÆA (ENCHANTER'S NIGHTSHADE)

Low, delicate perennials; the calyx-tube 2-lobed, slightly prolonged beyond the ovary; its limb deciduous; petals white; fruit indehiscent, small, bristly, with hooked hairs; the small white flowers in racemes. (*Circe*, an enchantress).

1. *C. pacifica* Arch. Glabrate; stems simple; 2-3 dm. high, from a small tuber; leaves ovate-denticulate, 3-5 cm. long; racemes bractless; calyx white; fruit 1-celled, 1-seeded, obovoid; woods, coast to Rockies.

2. *C. alpina* L. Similar; glabrous, leaves rather coarsely dentate; racemes with minute bracts; fruit narrowly obovoid. Woods, Rockies and Selkirk, where the two species often grow together; Alaska.

3. EPILOBIUM (WILLOW HERB)

Annual or perennial with mostly opposite, nearly sessile leaves; petals and sepals 4, the calyx-tube short or slightly produced beyond the ovary; stamens 8, inserted on the calyx-tube, 4 shorter; stigma with 4 short or long lobes; seeds with a silky coma. (Greek *epi*, on, and *lobion*, a little pod, in allusion to the structure of the flower).

Petals large, entire, pink, the calyx-tube divided to the summit of the ovary (sub-genus *Chamænerion*).

Inflorescence short with leafy bracts

Inflorescence elongated with small bracts

Petals notched, usually small, the calyx-tube prolonged above the ovary (sub-genus *Lysimachion*).

Petals yellow, 1.5 cm. long.

Petals white, or pink, less than 1 cm. long, stigma lobes short.

Annuals.

Stems and leaves pubescent

Stems glabrous below, leaves glabrous

Perennials.

Tall, 4-9 dm. high.

Leaves linear-oblong, revolute

Leaves lanceolate, not revolute.

Simple, pedicels usually more than 1 cm. long

Branching, pedicels usually less than 1 cm. long

Low, usually under 2 dm., alpine.

Seeds smooth.

Leaves entire, 1-2 cm. long

Leaves denticulate, 3 cm. long

Seeds papillate

Most of the leaves entire, all erect

Most of the leaves denticulate, all spreading or ascending.

Stems branching

Stems simple.

Tufted, stems uniformly pubescent

Not tufted, pubescence of the stem in lines.

Largest leaves 1 cm. broad

Largest leaves 5 mm. broad

2. *E. latifolium*.

1. *E. angustifolium*.

3. *E. luteum*.

4. *E. minutum*.

5. *E. paniculatum*.

6. *E. palustre*.

7. *E. Halleanum*.

8. *E. adenocaulon*.

9. *E. anagallidifolium*

10. *E. alpinum*.

11. *E. Pringleanum*.

12. *E. leptocarpum*.

13. *E. clavatum*.

14. *E. Hornemanni*.

15. *E. Davuricum*.

1. *E. angustifolium* L. (WILLOW HERB, FIRE-WEED). Perennial, simple or branching above, 0.5-2 m. high; leaves lanceolate, subentire, short petioled, the largest 1-2 dm. long; inflorescence elongated; petals 1-1.5 cm. long; style longer than the stamens, deeply cleft, hairy at base, the stigmas recurving. Common. Var. ———? Petals pale, pods canescent. Port

Haney. Var. ———? Petals pale, or pink with a white limb, half as long as in the species, not exceeding the calyx, more or less crisp-margined. Field.

2. *E. latifolium* L. Perennial, branching from the base, 2-4 dm. high; leaves ovate-lanceolate, entire or denticulate, thickish, nearly or quite sessile, the largest 4-6 cm. long; inflorescence short, the petals 1.5-2.5 cm. long, style shorter than the stamens, glabrous. Hope; Golden; Mts.; Alaska.

3. *E. luteum* Pursh. Stem slender, about 3 dm. high, glabrous below; leaves ovate-lanceolate, 4-8 cm. long, glandular-denticulate; inflorescence glandular-pubescent; flowers few; corolla 1.5 cm. long, light-yellow; style exserted, the stigmas short; pedicels 1 cm. long, seeds smooth. Along streams, Cascade Mts.; Selkirs; Alaska.

4. *E. minutum* Lindl. Stems slender, 2-4 dm. high, pubescent to base, hardly at all glandular, simple or usually branching; leaves 1-3 cm. long, linear-lanceolate, entire or nearly so; petals 3 mm. long, usually white; the stigma lobes very short; pods 2-3 cm. long, short-pediceled; falcate-fusiform; seeds minutely reticulated. Dry hillsides, V. I.; Vancouver; Columbia Valley.

5. *E. paniculatum* Nutt. Stems often white below, usually tall and diffusely branched, 3-9 dm. high, glabrous nearly to the inflorescence; leaves linear to narrowly lanceolate, 1-5 cm. long, often folded, entire or denticulate; corolla pink, 4-7 mm. long; calyx-tube turbinate; pods 2-3 cm. long, fusiform, falcate or straight, short- or long-pediceled; seeds papillate. Dry ground, common.

6. *E. palustre* L. Stems ascending at the base, pubescent, 2-6 dm. high, simple, slender; leaves linear-lanceolate, the largest 3-6 cm. long, shorter than the internodes, 3-8 mm. broad, with revolute margins; petals 5 mm. long, white or pink; calyx turbinate. (*E. lineare*). Swamps; Alaska; Cameron Lake, V. I.; Selkirs.

7. *E. Halleanum* Haus. Resembling a simple *E. adenocaulon*; stem tall, rather slender, usually simple, producing subterranean bulblets, glabrous below, uniformly puberulent above; leaves less than 3 cm. long, scattered, ovate-lanceolate, clasping by the broad base, often decurrent, denticulate; pods in the upper axils of the elongated inflorescence on pedicels 2 cm. or more in length; seeds very finely papillose, with an oblique hyaline beak. (*E. brevistylum* Trel.) Nanaimo; Glacier.

8. *E. adenocaulon* Haus. Stems rather stout, often with pubescent lines from the leaf-bases, glabrous below, minutely glandular-pubescent above, often densely so; in autumn developing basal rosettes; leaves lanceolate, glandular-serrate, rounded or cordate at base, sub-sessile with a short, winged petiole; the largest 5-10 cm. long, and 1-3 cm. broad; petals red or white, 4-6 mm. long; capsule with pedicels 4-10 mm. long; seeds minutely papillate, hardly tapering at the apex common; V. I. to N. B.

9. *E. anagallidifolium* Lam. Stems simple, and delicate, 0.5-2 dm. high, solitary, with pubescent lines; leaves 1-1.5 cm. long, 0.7 cm. wide, entire, an occasional one denticulate; obtuse, flowers few, often 1, nodding; pedicels 5 mm. long, or longer; seeds smooth. Mts., coast to Rockies; Alaska.

10. *E. alpinum* L. Simple, 2-3 dm. high; stems with decurrent pubescent lines; solitary or tufted; leaves distant, ascending, denticulate, elliptical-oblong, short-petioled, 2-4 cm. long; flowers few; petals 5 mm. long; pods slender 3-5 cm. long on pedicels 1 cm. long, seeds smooth. Alpine; descending to the valleys along mt. streams; Alaska.

11. *E. Pringleanum* Haus. Similar in general appearance to the preceding; stem with leafy stolons at base, very slender, 1-2 dm. high, glandular pubescent above, more or less pubescent in lines and around the stem below; leaves entire, erect, 1-2 cm. long, 3-5 mm. broad; the midrib rather prominent at the narrowed base; flowers erect; pods 2.5-3 cm. long, on pedicels $\frac{1}{2}$ to $\frac{3}{4}$ as long; seeds grayish, papillose. Mt. Cheam.

12. *E. leptocarpum* var. *Macounii* Trel. Somewhat branched, the stems hardly 1 dm. high, crisp-pubescent on lines from the bases of the leaves; producing subterranean winter bulblets; leaves less than 2 cm. long, ovate-lanceolate denticulate, with a winged petiole; petals red, 4 mm. long; calyx-tube narrow; pods 2 cm. long, pubescent, on very slender pedicels nearly as long; seeds hyaline-beaked. Lake Louise.

13. *E. clavatum* Trel. Densely tufted, about 1 dm. high; stems glandular, uniformly pubescent; leaves ovate, 1-1.5 cm. long, subsessile, denticulate, firm; petals red, 5-6 mm. long; pod 2-3 cm. long, clavate, on pedicels 1 cm. long or less; seeds papillate, somewhat fusiform, with a pale or hollow apex. Mts. Cascades to Rockies, Mt. Cheam.

14. *E. Hornemanni* Reich. Stems simple, solitary, 1-2.5 dm. high, glabrous except the decurrent lines; leaves ascending, the largest 2.5 cm. long, elliptical-oblong, or the lower obovate, denticulate to nearly entire; flowers several, erect; pods 3-4 cm. long on pedicels 1 cm. long; seeds papillate. Common in mt. meadows.

15. *E. Davuricum* Fisch. Mostly simple, producing rosettes at base in autumn, 1-2 dm. high; stems very slender, sparingly pubescent in lines, leaves less than 1.5 cm. long, sometimes alternate above, linear or ovate-oblong, remotely denticulate, sessile above, short-petioled below; flowers nodding; pod 4 cm. long, on long slender pedicels; seeds papillate. Bogs, Alaska to Wn.; Mt. Cheam.

4. GAYOPHYTUM

Very slender, branching annuals, with linear entire leaves, and small axillary flowers; the calyx-tube not prolonged beyond the ovary, the lobes reflexed, stigma not lobed; petals white or rose. (Greek *gaios*, land, *phyton*, a plant).

1. *G. ramosissimum* T. & G. Glabrous or the inflorescence puberulent, 1 dm. or so high; diffusely slenderly branched; flowers 1-2 mm. long; capsule 5 mm. long on pedicels about as long, often deflexed; the anthers of the shorter stamens often abortive. Penticton.

5. ÆNOTHERA (EVENING PRIMROSE)

Calyx-tube prolonged above the ovary, deciduous, the 4 lobes reflexed; stamens 8, usually equal, with versatile anthers; capsule long or short, 4-valved, many-seeded; flowers mostly yellow.

Stigmas capitate	1. <i>O. strigulosa</i> .
Stigmas lobed.	
Flowers white or pink.	
Leaves glabrous, stamens unequal	3. <i>O. pallida</i> .
Leaves hirsute, stamens equal	5. <i>O. Hookeri</i> .
Flowers yellow.	
Petals and pods 5-12 mm. long.	2. <i>O. pumila</i> .
Petals and pods longer.	
Petals 1.2-2 cm. long	4. <i>O. muricata</i> .
Petals 2-3.5 cm. long	5. <i>O. Hookeri</i> .
Petals 4-6 cm. long	6. <i>O. grandiflora</i> .

1. *O. strigulosa* T. & G. Hirsute to smooth, 2-3 dm. high; leaves linear to lanceolate; petals 2 or 3 mm. long, yellow or turning red; stamens slightly unequal; capsule 1.5 cm. long, curved or twisted; seeds in 1 row in each cell. Cedar Hill, Victoria. (*Sphæro stigma*).

2. *O. pumila* L. Perennial, 3-4 dm. high; leaves often secund, entire, spatulate below, oblong above; inflorescence recurving; petals about 8 mm. long; seeds clustered, not in rows. Introd. New Westminster.

3. *O. pallida* Lindl. Stem often white and shreddy, 2-6 dm. high, glabrous or pubescent; leaves glabrous, linear to oblong-lanceolate, entire or denticulate; flowers nodding in bud; petals 1.5-3 cm. long; pods 2.5 cm. long, often twisted; seeds in 1 row in each cell. Dry plains, Sask. to Wn.; Spence's Bridge.

4. *O. muricata* L. Stout, 2.5-15 dm. high, pubescent to hirsute, the hairs often reddish-tuberculate at base; leaves lance-oblong, entire, or slightly repand-denticulate, and passing without marked transition into bracts; flower-buds erect, pods more or less hirsute, 2.5 cm. long; seeds in 2 rows. (*O. biennis muricata* Lindl.) Kootenay; Kaslo.

5. *O. Hookeri* T. & G. (*O. biennis hirsutissima* Gray). Slightly distinguished from *O. muricata* by the more plentiful pubescence and the yellow or purplish, usually larger flowers, becoming lighter in drying. Shuswap Lake. *O. biennis* L. Bracts smaller, scarcely exceeding pods. Introd., New Westr.

6. *O. grandiflora* Ait. Stout biennial, 4-10 dm. high, pubescent; leaves oblong-lanceolate, denticulate; petals yellow, 4-5 cm. long; pod more or less hirsute; seeds in 2 rows. Introd. roadsides. Vancouver; New Westminster; etc; sometimes seen in gardens.

6. BOISDUVALIA

Erect, very leafy annuals, with purple flowers in a leafy terminal spike; calyx-tube prolonged above the ovary, deciduous, the lobes erect; stigma-lobes short; capsule cylindrical; seeds few, 1 row in each cell. (Bois Duval, a French naturalist).

1. *B. Douglasii* Spach. Almost canescent; leaves narrowly lanceolate, denticulate or entire, the floral bracts about as broad, but shorter; petals 4 mm. long; capsule cylindrical, 1 cm. long, the partitions in dehiscence separating from the valves. - Low, undrained soil, Victoria.

2. *B. glabella* Walp. Glabrous or slightly pubescent, 1-2 dm. high; leaves ovate to oblong, serrate, the floral bracts scarcely smaller; petals 2 mm. long; capsule 6-8 mm. long, the partitions adherent to the valves. Ditches and wet places. Attributed to British Columbia by Howell.

7. GODETIA

Simple or branched annuals, with showy, few-flowered racemes; calyx-tube produced a little beyond the ovary; petals rose or lilac, the stamens opposite the petals shorter than the rest; stigma-lobes short; seeds angled, in 1 or 2 rows in each cell; capsule pubescent. (Godet, a French botanist).

1. *G. caurina* Abrams. Erect, 1-3 dm. high, puberulent, leaves linear-lanceolate, entire; petals 1-2 cm. long, purple; calyx-tips mostly united; anthers 3 mm. long, glabrous, fertile to the tip; stigmas 3 mm. long; capsule 20-25 mm. long; pedicel 1-8 mm. long. Dry hills, Victoria. Apparently very variable in size of corolla and length of pedicel.

2. *G. epilobioides* Wats. Erect, 3 dm. high, tomentosely puberulent; leaves linear to linear-lanceolate, 2-4 cm. long, petioled; petals rose-purple, 6-12 mm. long; calyx-tips mostly united; capsule 12-28 mm. long, on a pedicel 1-4 mm. long. Mt. Finlayson, V. I.

8. CLARKIA

Annuals with showy, purplish flowers; calyx-tube produced above the ovary, the deciduous lobes reflexed, stigma-lobes broad. (Name in honor of W. Clarke, of the Lewis and Clarke expedition).

1. *C. pulchella* Pursh. Usually simple, 1.5-2.5 dm. high; leaves linear-oblong, puberulent, entire; the alternate stamens rudimentary, filiform; the fertile anthers curling from the apex; capsule 1-2 cm. long; seeds obliquely cubical. Dry Interior, southward; Grand Forks; Castlegar.

UMBELLIFERÆ (PARSLEY FAMILY)

Herbs, stems usually hollow; leaves mostly decompose, the petioles expanding and sheathing at the base; flowers small, in simple or compound umbels, with or without primary bracts (involucre) and secondary bracts (involucre); calyx adhering to the 2-celled ovary; the limb 5-toothed or obsolete; petals 5; stamens 5, inserted on the ovary; styles 2, surmounting a projection at the top of the ovary (the stylopodium); fruit separating into 2 carpels, the inner faces of which form the commissure; each carpel with 5 primary ribs, and often with 4 secondary ones, in the intervals between which, and on the commissure, are oil-tubes (best seen in thin, transverse slices). The classification depends mainly on characteristics of the mature fruit.

Fruit bristly or scaly.

Flowers in dense heads, fruit scaly 1. *Eryngium*.

Flowers in umbels, fruit bristly.

Fruit globose or ovoid.

Ribs of fruit wanting.

Fruit beaked, involucre none 2. *Anthriscus*.

Fruit not beaked, involucre foliaceous 3. *Sanicula*.

Ribs present.

Bristles of fruit barbed 4. *Daucus*.

Bristles of fruit hooked 5. *Caucalis*.

Fruit linear 6. *Osmorrhiza*.

Fruit smooth or slightly pubescent.

Leaves reduced to hollow, septate petioles. 7. *Lilæopsis*.

Leaves normal.

At least the basal leaves simple.

Low, umbels simple 8. *Hydrocotyle*.

Tall, umbels compound.

Basal leaves ovate 9. *Zizia*.

Basal leaves linear-lanceolate 10. *Bupleurum*.

Leaves divided.

Fruit flattened dorsally, i.e. parallel to the commissure

Flowers purple 11. *Leptotænia*.

Flowers white.

Stems short or none 12. *Lomatium*.

Stems long.

Leaf-segments large.

Petioles woolly, ribs of fruit filiform 13. *Heracleum*.

Petioles glabrous; ribs of fruit prominent 15. *Angelica*.

Leaf-segments small; ribs winged 16. *Conioselinum*.

Flowers yellow.

Fruit with thin marginal wings.

Stems short or none; stylopodium wanting 12. *Lomatium*.

Stems long; stylopodium flat 14. *Pastinaca*.

Fruit with thick, marginal wings; stylopodium none 11. *Leptotænia*.

Fruit terete or compressed laterally.

Flowers yellow.

Leaf segments filiform 17. *Fœniculum*.

Leaf segments not filiform.

Ribs winged.

Involucre as long as the rays. 15. *Angelica*.

Involucre wanting 18. *Cymopterus*.

Ribs filiform 26. *Petroselinum*.

Flowers white.

Fruit terete or slightly flattened laterally or dorsally.

Ribs of fruit rounded.

Stems weak, reclining; calyx-lobes prominent 19. *Ænanthe*.

Stems stout, erect; calyx-lobes wanting 20. *Cœlopleurum*.

Ribs of fruit acute or winged.

Plants tomentose, low. 21. *Glehnia*.

Plants glabrate, tall.

Fruit oblong, lateral wings narrow.

Oil-tubes small, 2-6 in the intervals 22. *Ligusticum*.

Oil-tubes large, solitary in the intervals 16. *Conioselinum*.

Fruit nearly as broad as long, lateral wings broad 15. *Angelica*.

Fruit compressed laterally, i.e. perpendicularly to the commissure.

Fruit elongate; oil-tubes obsolete in mature fruit. 6. *Osmorrhiza*.

Fruit not elongate.

Leaves decomposed.

Oil-tubes none; stems spotted with red 23. *Conium*.
Oil-tubes solitary on the intervals; stems not spotted.

Very stout plants; leaf-divisions large; fruit-ribs corky, broad 24. *Cicuta*.

Rather slender; leaf-divisions small; fruit-ribs filiform 25. *Carum*.

Leaves once pinnate.

Calyx-teeth obsolete, oil-tubes 1-several in the intervals; aquatic.

Ribs of fruit prominent, stylopodium flat 27. *Sium*.

Ribs of fruit not prominent, stylopodium conical. 28. *Berula*.

Calyx-teeth evident, oil-tubes solitary, not aquatic. 25. *Carum*.

1. **ERYNGIUM** (ERYNGO)

Perennial with thick, toothed leaves, the lower reduced usually to petioles; calyx-teeth prominent; fruit ribless, ovate, covered with scales; flowers white or bluish, stylopodium wanting. (An old name).

1. *E. articulatum* Hook. Erect, 3 dm. high, basal petioles with or without small lanceolate blades; involucre of spiny-toothed bracts, longer than the heads. Wet places. Northern Idaho and B. C. (Howell).

2. **ANTHRISCUS** (CHERVIL)

Tall herbs with decomposed leaves and white flowers; involucre none; calyx-teeth obsolete; fruit ovate, beaked, covered with hooked bristles in our species. (The Latin name).

1. *A. vulgaris* Perr. Erect, stout, 6-9 dm. high, stems glabrous; leaves pubescent, the base of the petioles woolly-margined; fruit about 3 mm. long, the beak smooth. Waste places, Nanaimo. Introd.

3. **SANICULA** (SANICLE)

Glabrous herbs with mostly palmately divided leaves and yellow or purple flowers in globose umbels, on about 3 primary rays; involucre foliaceous, involucels small, calyx-teeth lanceolate; stylopodium flat; fruit globose, the carpels hardly separating, ribless, covered with hooked bristles. (Name from San Nicolas?)

Leaves pinnately divided, flowers purple 1. *S. bipinnatifida*.
Leaves palmately lobed or divided, flowers yellow.

Mature fruit stipitate or pedicelate.

Involucels small, fruit bristly all over 2. *S. Menziesii*.

Involucels large, fruit naked at base 3. *S. arctopoides*.

Mature fruit not stipitate nor pedicelate.

Leaves with main divisions confluent at base; involucels large 4. *S. Howellii*.

Basal leaves divided or nearly so.

Leaves large, main divisions not stalked 5. *S. marylandica*.

Leaves small, main divisions stalked 6. *S. septentrionalis*.

1. *S. bipinnatifida* Dougl. Stems clustered, 3-5 dm. high, stem leaves few, the basal bipinnatifid, the lobes decurrent in narrow, toothed wings; umbels short or long-rayed; flowers purple, the sterile on long pedicels, the fertile sessile. Open places, Victoria.

2. *S. Menziesii* Hook. Stems solitary, 3-8 dm. high; leaves round-cordate, deeply 3-5-lobed, the lobes rounded below, the lower on petioles once or twice as long, the teeth with long, slender bristles; sterile flowers nearly sessile; involucels of small, entire bractlets; fruit obovoid, 2-4 mm. long, becoming pedicelate. Open places, Victoria; Boundary Bay.

3. *S. arctopoides* H. & A. Stems short, producing scape-like branches 1-2 dm. long; leaves deeply 3-lobed, the divisions cleft into acute spreading segments; involucre of 1-2 leaf-like bracts, involucels conspicuous, of 8-12 oblanceolate bractlets; seed-face almost plane. Near Victoria; Queen Charlotte Is.

4. *S. Howellii* C. & R. Stems coarse, 2-3 dm. high, often bearing tufts of stout, elongated peduncles; leaves 3-5-lobed, the upper inclined to be pinnately lobed, the teeth mucronate tipped; fruit 3-4 mm. long, short-stipitate, the seed-face concave. Clay cliffs, Beacon Hill, Victoria.

5. *S. marylandica* L. (SNAKE-ROOT). Erect, 3-10 dm. high; leaves large, 5-7-parted or nearly divided, the divisions acute, the teeth with short, rigid bristle tips, the lower on petioles 3-4 times as long; involucre very large; sterile flowers often in separate heads, pedicelate; fruit sessile, ovoid. Open woods, Armstrong; Agassiz; Rockies.

6. *S. septentrionalis* Greene. Slender, 1-3 dm. high; several peduncles arising along the stem; leaves ternate or biternate, the main divisions stalked; umbels simple or compound; involucre of pinnatifid leaf-like bracts; involucels of small, more or less united bracts; sterile flowers pediceled; fruit sessile. Dry hillsides, Victoria, northw. V. I.; Revelstoke.

4. DAUCUS (CARROT)

Hirsute-bristly biennials or annuals, with tri-pinnate leaves, foliaceous pinnately cleft involucre, and white flowers; calyx-lobes obsolete; fruit oblong, flattened dorsally, the 5 primary ribs bristly, the 4 secondary ribs winged, prickly; oil-tubes solitary under the secondary; stylopodium flat or none. (The ancient name).

1. *D. pusillus* Mich. (WILD C.) Stems retrorsely papillate-hispid, 1-6 dm. high; leaf-segments linear, rays of umbels 1-3.5 cm. long. Dry hills, V. I.; Crescent.

2. *D. carota* L. (CULTIVATED C.) Stems bristly-hairy, 3-9 dm. high; leaf-segments linear-lanceolate, cuspidate, rays many, the outer 4.5 cm. long, umbels becoming hollowed like a bird's nest. A garden escape.

5. CAUCALIS (HEDGE-PARSLEY)

Nearly glabrous annual, with pinnately dissected leaves and white or reddish flowers in compound umbels; calyx-lobes prominent; fruit ovate or oblong, flattened laterally; carpels with 5 filiform bristly primary ribs and 4 prominent hooked secondary ones; oil-tubes solitary in the intervals, 2 on the commissure; stylopodium conical. (The Greek name).

1. *C. microcarpa* H. & A. Stem slender, 1-3 dm. high; leaves much dissected; involucre bracts foliaceous, divided; involucels entire or divided; pedicels and rays very unequal; fruit 4-5 mm. long, armed with rows of hooked prickles. Departure Bay, V. I.

6. OSMORRHIZA (SWEET CICELY)

Perennials from fleshy, often fusiform roots; leaves ternate, the divisions broad; involucre and involucels small or none; umbels long-rayed, few-flowered; calyx-teeth obsolete; stylopodium small, conical; fruit linear, bristly or glabrous, attenuate at base; oil-tubes obsolete. (Greek *osme*, a scent, *rhiza*, a root).

Flowers purple	1. <i>O. purpurea</i> .
Flowers white, carpels attenuate at base.	
Fruit bristly.	
Fruit rounded at apex	2. <i>O. obtusa</i> .
Fruit acute at apex	3. <i>O. divaricata</i> .
Fruit glabrous, carpels not long-attenuate.	4. <i>O. occidentalis</i> .

1. *O. purpurea* C. & R. Near glabrous, 1-6 dm. high; basal leaves clustered, 1-3-ternate; leaflets ovate to lanceolate, sharply lobed or toothed; fruiting umbels of 2-4 rays, 5-7.5 cm. long; fruit slightly hispid at base, glabrous above, 10-12 mm. long, on pedicels 12-20 mm. long. Sitka to Wn.; Mts., Kootenay Lake.

2. *O. obtusa* (C. & R.) Fernald. Stems glabrous or sparingly pubescent, 2-7 dm. high; leaflets 3-6 cm. long; leaves 2-3 ternate, slightly pubescent; umbels naked, with 3-5 divergent rays; fruit about 16 mm. long, rounded at apex, hardly beaked; stylopodium depressed, with the style 0.5 mm. long. (*O. unda* in part). Woods, eastw.

3. *O. divaricata* Nutt. Similar; 4-10 dm. high, umbels with 3-7 ascending rays and pedicels; stylopodium conical, the fruit 15-22 mm. long with a conspicuous sharp beak; stylopodium and style 1 mm. long. Woods, V. I.; Vancouver eastw.; also in mountains. (*O. nuda* in part). *O. Leibergeri* C. & R. may be distinguished from this species by the fruit constricted below the apex, with a truncate beak. Common on V. I.; west of Cascades.

4. *O. occidentalis* Torr. Rather stout, leaves 2-3-ternate; leaflets 3.5-10 cm. long; umbels naked or 1-2-bracted, with 5-12 erect rays, forming a compact cluster of fruit; fruit 12-16 mm. long, not attenuate at base; conical stylopodium with style 1-2 mm. long. Rockies; Hope-Princeton Trail.

7. LILÆOPSIS

Low, creeping perennials; marsh herbs; the leaves reduced to septate, hollow petioles; umbels simple, springing from the base; fruit globose, somewhat flattened laterally; oil-tubes solitary in each interval. (*Lilæa*, another genus, *opsis*, aspect). (*Crantzia*).

1. *L. occidentalis* C. & R. Leaves 2-10 cm. long, tapering from the base; umbels with 4-7 rays, the peduncles shorter than the leaves; flowers white. Salt marshes, Nanaimo; Burrard Inlet.

8. HYDROCOTYLE (WATER PENNYWORT)

Low perennials with creeping stems, simple, sometimes pellate, round-reniform leaves and whitish flowers in verticels or simple umbels; fruit strongly flattened laterally on short pedicels, orbicular, the ribs obscure or filiform; oil-tubes wanting; calyx-lobes obsolete. (Greek *hydor*, water, *kotyle*, a flat cup, in allusion to the peltate leaves of some species).

1. *H. ranunculoides* L. Leaves thick, round-reniform, cordate, 3-7-cleft, crenate; peduncles shorter than the petioles and reflexed in fruit; fruit round-reniform, notched at base; carpels with one evident rib on each face. In a wet place, Departure Bay.

2. *H. vulgare* L. Leaves thick, orbicular peltate, slightly 5-9-lobed and crenate, about 2 cm. broad; inflorescence of verticels; peduncles shorter than the petioles, more or less erect in fruit; fruit sub-orbicular, sub-sessile, 3-nerved on each face. Wet ground, Coquitlam (J. Davidson).

9. ZIZIA (ALEXANDERS)

Glabrous; basal leaves undivided; central flower of the yellow umbels sessile, involucre none, involuclers small; calyx-teeth prominent; stylopodium none; styles long; fruit oblong-ovate, flattened laterally; the carpels and seeds terete; oil-tubes large, solitary in the intervals, a small one in the filiform ribs. (Ziz was a Rhenish botanist).

1. *Z. cordata* (Walt.) DC. About 3 dm. high; basal leaves ovate, cordate or truncate-crenate; stem leaves in 3 divisions, serrate; fruit 3 mm. long. Meadows; Crow's Nest Pass.

10. BUPLEURUM (THOROUGH-WAX)

Glabrous; leaves simple; calyx-lobes wanting; fruit oblong, flattened laterally with distinct ribs; stylopodium flat, prominent.

1. *B. americanum* C. & R. Slender, 2 dm. high or more; glaucous, basal leaves linear-lanceolate; stem leaves ovate or lanceolate, all entire; involucre and involuclers of ovate bracts; flowers white, the slender rays 1-4 cm. long; one oil-tube in each rib. Alaska to Wn.

11. LEPTOTÆNIA

Stout, short-stemmed, with thick or fusiform roots, dissected leaves and yellow or purplish flowers; fruit oblong-elliptical, glabrous, flattened dorsally; the dorsal ribs filiform, the lateral wings thick, corky; oil-tubes 3-6 in the intervals, small or obsolete. (Gk. *leptos*, slender, *tainia*, a band, in allusion to the filiform ribs).

1. *L. dissecta* Nutt. Flowers purple; stems 3-9 dm. high; leaves puberulent, large, 3 dm. long or more, ternate and 3-pinnate, the segments ovate, 12-20 mm. long; involucre of a few linear bracts, fruit 10-15 mm. long, nearly sessile; seed-face plane. Spence's Bridge; Armstrong; Gordon Head, V. I.

2. *L. multifida* Nutt. Flowers yellow or purple; stems 3-6 dm. high, somewhat spreading; leaves puberulent, ternate and pinnate, finely dissected, involucre wanting; fruit 8-12 mm. long on pedicels 6 mm. long or more; seed-face concave. Crow's Nest Pass; Lytton; Kamloops.

12. LOMATIUM (HOG-FENNEL)

Acaulescent or short-stemmed perennials, with ternate or dissected leaves, and white or yellow flowers; calyx-teeth mostly obsolete; fruit strongly flattened dorsally and winged; stylopodium wanting. (Gk. *loma*, a border, descriptive of the wings of the fruit).

Flowers white.

Plants pubescent from a thick root 1. *L. macrocarpum*.
Plants glabrous from a tuberous root 2. *L. farinosum*.

Flowers yellow.

Leaf-segments large, 2 cm. long or more, mostly entire
Rays swollen at the top, leaf-segments broad 3. *L. nudicaule*.
Rays not swollen, leaf-segments narrow 4. *L. triternatum*.
Leaf-segments small, 1 cm. long or less.

Roots tuberous.

Involucel wanting, fruit linear 5. *L. ambiguum*.
Involucel conspicuous, fruit oval 6. *L. utriculatum*.

Roots thick, hardly tuberous, fruit oblong or oval.

Leaf-segments obovate, involucel small or wanting 7. *L. Martindalei*.
Leaf-segments linear, involucel present 8. *L. Sandbergii*.

1. *L. macrocarpum* (Nutt.) C. & R. Stout, short-stemmed, 2-5 dm. high; pubescent or almost canescent; leaves ternate, the divisions pinnate, alternate segments short, rays equal, 1.5-3 cm. long; involucels conspicuous, the bracts lanceolate, often united; calyx-teeth evident; fruit on pedicels 3-4 mm. long, elliptical, about 13 mm. long; the wings nearly as wide as the body; oil-tubes large, solitary in intervals, 2 on the commissure. Common; plains, D. I., Lytton, eastward.

Var. *eurycarpum* Gray. Wings of fruit narrow, about half as wide as the body. Columbia Valley; Lytton.

2. *L. farinosum* (Geyer.) C. & R. Rather slender, from a deep tube; leaves 2-3 ternate, the ultimate segments small, linear, involucels of small linear bractlets; fruit nearly sessile, 6-8 mm. long; oil tubes small, several in the intervals, 2-4 on the commissure. Attributed to B. C. by Howell. Idaho boundary.

3. *L. nudicaule* Pursh. (INDIAN CONSUMPTION PLANT). Nearly stemless, 3-4 dm. high, glabrous; leaves biternate, the leaflets oblong to lanceolate, 9-20 mm. wide, entire or toothed at the apex; rays very unequal, 2-15 cm. long, involucre wanting; fruit oval, about 1 cm. long, with a medium wing; oil-tubes solitary in the intervals, 4 on the commissure. Dry hillsides, V. I.; Sandy spit, Boundary Bay; D. I.; Lytton, etc. (*L. leiocarpum* Nutt.)

4. *L. triternatum* (Nutt.) C. & R. Caulescent from a fusiform root; leaves biternate, the segments linear-lanceolate, entire, 3-6 cm. long; involucels of linear bracts, or wanting; fruit narrowly oblong with narrow wings, and somewhat prominent dorsal ribs; oil-tubes large, solitary, 2 on the commissure. Lytton; Rockies. Var. *brevifolium* C. & R. Leaflets broader, toothed. Spence's Bridge.

5. **L. ambiguum** (Nutt.) C. & R. Slender, caulescent, 3-5 dm. high, glabrous and not usually tuberous; leaves pinnately dissected, the whole petiole dilated; rays of umbel very unequal, 2-8 cm. long; involucre none; fruit narrowly oblong, about 2 mm. wide, on pedicels 5 mm. long; oil-tubes solitary, 2 on the commissure. Common, plains D. I.; Princeton; Vernon. Var. **leptocarpum** C. & R.; fruit sessile or nearly so; may also occur.

6. **L. utriculatum** Nutt. (C. & R.) Usually caulescent, 2-4 dm. high, from a more or less tuberous root, pubescent or glabrous; the whole petiole dilated; leaves much dissected into short linear segments; rays somewhat unequal, 2-7 cm. long; fruit glabrous, about 9 mm. long, elliptical, broadly winged; oil-tubes solitary, 4-6 on the commissure. Dry open places; V. I.; Boundary Bay; Lytton.

7. **L. Martindalei** var. **augustatum** C. & R. Hardly caulescent, 2-4 dm. high, glabrous; leaves bipinnate, the segments obovate, incised; flowers pale-yellow; rays 2-4 cm. long; fruit glabrous, about 1 cm. long, and 5 mm. wide, the dorsal ribs rather prominent; oil-tubes solitary in intervals, 2 on the commissure. Alpine, Mt. Arrowsmith, V. I.; Mt. Cheam.

8. **L. Sandbergii** C. & R. Usually caulescent, 2-4 dm. high, rough-puberulent, from a slender root; fruit ovate, puberulent, 5 mm. long, with very narrow wings; oil-tubes 4 or 5 in the intervals, 6 on the commissure. Passes of the Rockies; Kootenay.

13. HERACLEUM (COW PARSNIP)

Tall, stout perennials, with large ternately compound leaves; calyx-teeth small or obsolete; stylopodium conical; petals white, the outer often enlarged; fruit very flat, obovate, winged, the intermediate ribs filiform; oil-tubes solitary, prominent, little more than half as long as the carpel. (Name from *Hercules*).

1. **H. lanatum** Mich. Stout 12-24 dm. high; leaves often deeply lobed above, and woolly, especially on the much-inflated bases of the petiole; fruit 8-12 mm. long, slightly pubescent. Common, wet banks and woods; flowering in May; Alaska.

14. PASTINACA (PARSNIP)

Tall, glabrous biennials, with pinnately compound leaves; involucre and involucrels usually wanting; calyx-teeth obsolete; fruit oval, very flat dorsally, the dorsal ribs filiform, the lateral winged as in *Heracleum*; oil-tubes small, solitary in the intervals, 2-4 on the commissure. (*L. pastus*, food).

1. **P. sativa** L. A common weed, 3-15 dm. high, with a grooved stem.

15. ANGELICA

Stout perennials with ternately or pinnately compound leaves, often little or no involucre, and large umbels of yellow or whitish flowers; calyx-teeth obsolete; fruit ovate to oblong, with 2 distinct wings, and 3 prominent ribs on each side; stylopodium depressed or conical, crenulate; oil-tubes 1-several in the intervals, 2-10 on the commissure. (Name alludes to medicinal virtues).

Flowers white, involucre small or deciduous.

Involucrels linear

Involucrels wanting

Flowers yellow, involucre equaling the rays

1. *A. genuflexa*.

2. *A. Lyallii*.

3. *A. Dawsoni*.

1. **A. genuflexa** Nutt. Stout, 6-18 dm. high; glabrous except the inflorescence; leaves 1-2-ternate, the primary divisions often deflexed; involucre linear, deciduous or wanting; involucrels linear, sometimes long; rays 3-5 cm. long; fruit oblong, 3-4 mm. long; the wings nearly as broad as the body; oil-tubes 2 on the commissure. Common in wet thickets along the coast; flowering in August; Alaska.

2. **A. Lyallii** Wats. Stout, 6-15 dm. high; leaves ternate, thin, pinnate, the uppermost reduced to large inflated petioles; involucre and involucels wanting; rays 2.5 to 15 cm. long; pedicels coalescent at base; fruit 4-6 mm. long. Kootenay, Mts.

3. **A. Dawsoni** Wats. (MOUNTAIN PARSNIP). Plant 6-9 dm. high; bracts of involucre lobed, about as long as the rays; bracts of involucels toothed, a little longer than the pedicels; sterile flowers numerous; fruit oval, about 4 mm. long, the lateral wings distinct. (*Thaspium aureum involucreatum*). Mt. Fernie; Crow's Nest Pass.

16. CONIOSELINUM (HEMLOCK PARSLEY)

Tall, stout perennials with tri-pinnately decompose leaves; involucre and involucels present; flowers white; calyx-lobes obsolete or with a single large tooth; fruit flattened dorsally or almost terete, oblong, the dorsal ribs very prominent, the lateral usually broader; stylopodium slightly conical; oil-tubes solitary in the intervals or 2 in the 2 lateral, 2-4 on the commissure. (*Conium* and *Selinum* are two genera of the family).

Involucels not scarious, bractlets linear and conspicuous.

Rays about 3 cm. long; pedicels 4-8 mm. long; Western 1. *C. Gmelini*.

Rays about 6 cm. long; pedicels 12 mm. long; Eastern 2. *C. scopulorum*.

Involucels scarious, linear-oblong, abruptly ending in a long attenuation; Northern 3. *C. Dawsoni*.

1. **C. Gmelini** C. & R. Stem not very stout from tapering roots, glaucous, 6-15 dm. high; glabrous except the puberulent inflorescence; ultimate leaf-segments oblong, toothed or entire; rays 2-3.5 cm. long; fruit 4-5 mm. long, on pedicels 4-8 mm. long; involucels as long as the pedicels, or a little longer. (*S. Hookeri* Wats. *Selinum Benthami* Wats.) Coastal thickets. Flowering July and August; Alaska.

2. **C. scopulorum** (Gray) C. & R. Glabrous with puberulent inflorescence, 6-9 dm. high; lower leaves often large, 2-3-ternate, then 1-2-pinnate, the leaflets laciniately pinnatifid; the numerous rays 5-7.5 cm. long; fruit 6 mm. long; oil-tubes usually 1 in dorsal and 2 in lateral intervals. (*Ligusticum scopulorum*) Roger's Pass (?); Rockies; Wn.

3. **C. Dawsoni** C. & R. About 3 dm. high, glabrous; the small leaf-segments ovate; the linear bracts of the involucels longer than the pedicels, which are 2-4 mm. long; fruit oblong, about 4 mm. long, with prominent wings. Alaska, perhaps in Northern B. C.

17. FENICULUM (FENNEL)

Stout, strongly-odorous plants, with leaves dissected into filiform divisions; involucre and involucels wanting; flowers yellow, in large umbels; fruit oblong, glabrous, oil-tubes solitary.

1. **F. vulgare** Hill. (COMMON F.) A garden escape at Comox.

18. CYMPTERUS

Low plants with small, pinnate leaves, no involucre; involucels with lanceolate bracts and yellow flowers; calyx-lobes evident; fruit globose, flattened laterally if at all, the ribs with thin equal wings, the lateral distinct, i. e. double; stylopodium flat; oil-tubes 1-several in the intervals, 2-8 on the commissure. (Gk. *kyma*, a wave, *pteron*, a wing; the wings of the fruit are often wavy).

1. **C. terebinthus** T. & G. Decumbent, leafy at base, leaves 3-pinnate; leaflets very small; fruit 6-8 mm. long, on short pedicels. Rockies, Lat. 49°.

19. *ÆNANTHE* (WATER PARSLEY)

Glabrous with bipinnate leaves and white flowers; calyx-lobes prominent; stylopodium conical or hemispherical; involucre present or absent; fruit ellipsoidal, terete, or slightly flat laterally; oil-tubes solitary in the intervals, 2 on the commissure. (Gk. *oinos*, wine, *anthos*, a flower; some species were used for perfuming wine).

1. *O. sarmentosa* Presl. Stems weak, reclining, 6-10 dm. long; leaflets ovate, 2-5 cm. long; rays stout, angled, 2-3 cm. long; fruit sessile or nearly so. Ditches and wet ground, near the coast, Lower Fraser Valley; Nootka.

20. *CÆLOPLEURUM*

Stout, glabrous perennials with 2-3 ternate leaves, the segments broad, and greenish-white flowers; involucre of few bracts, involucre bracts linear; calyx-lobes obsolete; stylopodium flat; fruit oblong, slightly flattened laterally; ribs thick and corky, prominent dorsally, but not winged; oil-tubes solitary in the intervals, and 1 or 2 under each rib. (Gk. *koilos*, hollow, *pleuron*, a rib).

1. *C. longipes* C. & R. Bases of petioles much-inflated, leaflets ovate, 1.5-5 cm. long, often acute at base, serrate; rays many, the outer 4-5 cm. long, fruit strong-smelling, 4-6 mm. long, on pedicels 8-9 mm. long. Thickets near tidal waters, Vancouver and V. I. to Alaska. (*C. Gmelini* (DC) Ledeb, in part, an Alaskan species with fruit 9 mm. long).

21. *GLEHNIA*

Low, pubescent perennials, with thick 1-3-pinnate leaves; more or less conspicuous involucre and involucels and white flowers; calyx-teeth evident; fruit globose to oblong, slightly flattened dorsally, the ribs with thick, corky-wings, the lateral wings distinct, i.e. double; stylopodium flat; oil-tubes several in the intervals, 4-8 on the commissure.

1. *G. littoralis* Schmidt. A tomentose, prostrate, sea-shore plant; leaflets ovate or round, tomentose beneath; rays 1-2 cm. long; fruit sessile. Victoria; Alaska. (*Phellopteris littoralis*).

22. *LIGUSTICUM* (LOVAGE)

Glabrous perennials with aromatic roots, ternate leaves, and white flowers; stylopodium conical; calyx-lobes obsolete; fruit oblong or ovate, with acute, narrow, somewhat winged ribs, terete or slightly flattened laterally; oil tubes 2-6 in the intervals, 6-10 on the commissure. (Name from Liguria.)

Leaves ternately compound, leaflets serrate; seeds rounded on back	1. <i>L. scothicum</i> .
Leaves ternately and then pinnately compound; leaflets laciniate; seeds angled on back.	
Stems scapose; inflorescence glabrous	2. <i>L. Grayi</i> .
Stems leafy, inflorescence pubescent	3. <i>L. apiifolium</i> .

1. *L. scothicum* L. Stem simple, 3-6 dm. high; leaves biternate; thick, shining beneath; leaflets ovate, coarsely serrate; inflorescence glabrous; rays 2.5-7 cm. long; fruit narrowly oblong, about 9 mm. long. Alaska southward; Prince Rupert.

2. *L. Grayi* C. & R. Stems 3-6 dm. high, leaflets laciniately pinnatifid; rays 2.5-5 cm. long; fruit narrowly oblong, 4-5 mm. long; the ribs hardly winged, on pedicels 6-7 mm. long; summits of Gold Range; Ainsworth.

3. *L. apiifolium* Gray. Smooth, except the inflorescence and the leaf-margins, 6-9 dm. high; leaves ternate and then pinnate, the segments ovate and pinnatifid; rays 4 cm. long; pedicels 4-8 mm. long; fruit oval, 3-4 mm. long; seed round on the back. Selkirks.

26. PETROSELINUM

1. *P. hortense* Hoffm. (COMMON PARSLEY). Fruit much as in *Carum*; calyx-teeth wanting, flowers yellow, involucre and involucels small; basal leaves twice ternate; the ultimate segments obovate, incised; segments of stem-leaves narrower. A glabrous biennial, well established on a dyke, Lulu Island, New Westminster.

27. SIUM

Fruit with prominent corky ribs; stylopodium depressed; seed sub-angular, with plane-face, otherwise much as in *Berula*.

1. *S. cicutæfolium* Schrank. Stout, 6-15 dm. high; leaflets narrowly lanceolate, distant, finely and sharply serrate, 5-12 cm. long, or the immersed leaflets more or less dissected; fruit 3 mm. long on pedicels 2-6 mm. long. Common on the margins of lakes and in wet places, V. I. to Atlantic; New Westminster; Okanagan.

28. BERULA (WATER PARSNIP)

Glabrous, aquatic perennials, with simply pinnate leaves, evident involucre and involucels; and white flowers; calyx-teeth minute; fruit flattened laterally, round, notched at base; the carpels globose, with inconspicuous ribs; stylopodium conical; oil-tubes numerous; seeds terete.

1. *B. erecta*. (Huds.) Coville. Erect, 1.5-6 dm. high; leaflets linear to oblong or ovate, serrate, or lanceolately lobed, the upper with sharp, the lower with rounded, teeth or lobes, the upper leaflets often with a pair of erect lobes at the base, 1-6 cm. long; rays 5 cm. long or less; fruit 2 mm. long on pedicels 4-6 mm. long. Streams and ponds, Kamloops; Okanagan Valley, and eastward.

QUATSINO SCHOOL

QUATSINO, B.C.

ARALIACEÆ (GINSENG FAMILY)

Herbs or shrubs with simple or compound leaves, the flowers and flower-clusters much as in the umbelliferæ; but usually with more than 2 styles; petals and stamens 5, epigynous carpels 2-5; fruit a drupe.

Leaves compound	1. Aralia.
Leaves simple.	
Erect, prickly shrub	2. Fatsia.
Climbing, not prickly	3. Hedera.

1. ARALIA (SARSAPARILLA)

Stemless herbs (ours) with decomposed leaves; flowers small, perfect or polygamous, greenish, in umbels; carpels 5.

1. *A. nudicaulis* L. Stem very short, bearing a single leaf and a shorter, naked scape; leaflets oblong-obovate or oval, short pointed, serrate, 2-5 on each of the 3 divisions, the 5 carpels forming a 5-winged fruit. Princeton; Revelstoke; Mackenzie.

2. FATSIA

Shrubs prickly throughout; leaves palmately lobed; umbels numerous in an erect compound raceme; flowers greenish white, perfect or polygamous; calyx-lobes obsolete or nearly so; carpels 2.

1. *P. horrida* (Sm.) B. & H. (DEVIL'S CLUB). Stems 1-6 m. high, leafy at the top; leaves 3-5 dm. broad, prickly on the veins and along petioles; inflorescence terminal; fruit flat, oblong, red. Damp woods, coast; Alaska, Selkirks. The prickles are poisonous and may cause painful wounds.

3. HEDERA (ENGLISH IVY)

H. helix L. (ENGLISH IVY). Climbing by roots from the stem; leaves evergreen, 5-lobed, those of the fruiting branches not lobed; flowers greenish; petals 5, calyx with 5 teeth; styles 5; fruit black. Cultivated.

CORNACEÆ (Dogwood Family)

Leaves simple, entire, whorled or opposite; calyx-tube minute, adhering to the 1-2-celled ovary; stamens and petals epigynous; style 1; flowers (in ours) 4-merous.

CORNUS (Dogwood)

Herbs, shrubs or trees with perfect flowers; calyx minutely 4-toothed; petals small, white or purplish; flowers cymose, often surrounded by large, white, involucre bracts; fruit a white, or red drupe. (*L. cornu*, a horn, in allusion to the hard wood).

Herbs, flowers subtended by white involucre bracts 1-2 cm. long.

Leaves whorled at summit of stem 1. *C. canadensis*.

Leaves in pairs, not whorled 2. *C. suecica*.

Trees, bracts 4-6 cm. long 3. *C. Nuttallii*.

Shrubs, involucre bracts wanting.

Cymes and under surfaces of leaves with not sparse, spreading pubescence 4. *C. pubescens*.

Cymes and under surfaces of leaves with sparse, appressed pubescence 5. *C. stolonifera*.

1. *C. canadensis* L. (BUNCHBERRY). Low, usually simple, 1.5-4 dm. high, from a creeping rootstock; leaves in a whorl at the summit of the stem, (or in var. *intermedia* Farr. of the Rockies and Selkirks, with a pair of stem-leaves below the whorl), ovate or oval; bracts short-acuminate, sometimes blotched red; petals, at the coast, purplish with a white margin, or, in the Selkirks and Rockies, whitish, one of them bristly-tipped; fruit a bunch of red drupes; the stone globose. Common; woods, Alaska to Cal.

2. *C. suecica* L. Similar, 1-2 dm. high; leaves short, oval, in 3-6 sessile pairs, the nerves all springing from the base; involucre bracts obtusish; petals purple, the stone slightly flattened and channelled on both sides. Alaskan and northern.

3. *C. Nuttallii* T. & C. (FLOWERING D.) A small tree, the trunk occasionally becoming 5-6 dm. in diameter; leaves elliptical, short-acuminate, pubescent on both sides; bracts round-obovate, cuspidate; petals purple-tipped; head very dense; fruit red. Coast and V. I.

4. *C. pubescens* Nutt. (WESTERN D.) Shrub, 2-8 m. high, with red branches; stems erect, leaves ovate to elliptical, upper petioles 15 mm. long; almost tomentose beneath, acute or short acuminate; petals creamy, in a loose, many-flowered; cyme 3-7 cm. broad; fruit white or lead-colored. Salmon Arm to V. I.

5. *C. stolonifera* Michx. (RED-OSIER D.) Similar, 1-3 m. high, ascending or reclining, branchlets with appressed pubescence, or smooth; leaves glaucous beneath; upper petioles 22 mm. long; cymes rather smaller. Cascades, eastward; Alaska.

ERICACEÆ (Heath Family)

Trees, shrubs or herbs; leaves mostly alternate, without stipules; flowers 4-5-merous; stamens 8 or 10, usually opening by a pore, often appendaged with an awn on the back of the anthers; the pollen compound, of 4 united grains; ovary mostly 5-celled, style 1; fruit a capsule or berry. The genera fall into 3 sub-families:—

SUB-FAMILY I.—VACCINOIDEÆ. Ovary inferior, fruit a berry; including Nos. 1 and 2.

SUB-FAMILY II.—PYROLOIDEÆ. Ovary superior, fruit dry; corolla poly-petalous; anthers inverted; herbs (in ours); including Nos. 3, 4, and 5.

SUB-FAMILY III.—ERICOIDEÆ. Ovary superior, corolla mostly gamo-petalous; including the rest. These fall into 3 Tribes;

- (1) ARBUTEÆ. Fruit indehiscent, a berry; Nos. 8 and 9.
 (2) RHODODENDREÆ. Fruit a septicial capsule; Nos. 6, 7, 13, 14, 15 and 16.
 (3) ANDROMEDEÆ. Fruit a loculicidal capsule; Nos. 10, 11, and 12.

Ovary inferior.

- Anther-cells not prolonged into a tube, opening by a lateral chink,
 fruit white 1. Chiogenes.
 Anther-cells prolonged into a tube, opening by a terminal chink,
 fruit not white 2. Vaccinium.

Ovary superior.

Corolla polypetalous.

- Herbs, anthers inverted, (filaments apparently attached at the
 top).
 Scapes 1-flowered 4. Moneses.
 Flowers several to many.

- Flowers in umbels, stem leafy 5. Chimaphila.
 Flowers in racemes, plants nearly or quite stemless 3. Pyrola.

Shrubs, anthers attached by the base.

- Leaves evergreen, flowers white 6. Ledum.
 Leaves deciduous, flowers copper-colored 7. Cladothamnus.

Corolla gamopetalous.

- Trees 8. Arbutus.

Shrubs.

- Fruit a berry, or berry-like.
 Flowers in cymose clusters 9. Arctostaphylos.
 Flowers solitary or in racemes 10. Gaultheria.

Fruit a capsule.

- Anther-cells awned.
 Leaves less than 1 cm. long 11. Cassiope.
 Leaves more than 1 cm. long 12. Andromeda.

Anther-cells awnless.

- Leaves like those of Spruce or Fir 13. Phyllodoce.
 Leaves otherwise.

- Anthers in pouches in the corolla. 14. Kalmia.

Anthers not in pouches.

- Flowers 4-merous 15. Menziesia.

Flowers 5-merous.

- Low, procumbent 16. Loiselurea.

- Tall, erect 17. Rhododendron.

1. CHIOGENES (SNOWBERRY)

Slender, trailing evergreens, with small leaves, and stems clothed with rusty, bristly hairs; flowers solitary 4-merous; corolla bell-shaped; stamens 8; filaments short, broad; anthers not awned, opening by a chink to the middle; fruit a white, edible, 4-celled berry. (Greek *chion*, snow, *genos*, offspring, in allusion to the snow-white fruit).

1. *C. hispidula* (L.) T. & G. (CAPILLAIRE). Leaves 4-7 mm. long, round-ovate, revolute, more or less bristly beneath. Mossy woods. Sicamous; Emerald Lake; Rockies to Nfld.

2. VACCINIUM (BLUEBERRY, CRANBERRY)

Shrubs or trailing vines; corolla gamopetalous, 4-5-lobed or cleft; stamens 8-10; anthers awned or awnless, opening by pores; berry 4-5-celled or 8-10-celled by false partitions from the back of each cell. (Latin *vacca*, a cow, perhaps because a pasture plant).

- Vines, corolla 4-parted 1. *V. Oxycoccus*.

Shrubs, corolla 4-5-lobed.

Leaves deciduous, anthers mostly awned.

Tall, 5 dm. high or more.

- Fruit red; corolla greenish-white, depressed-globose, small 2. *V. parviflorum*.

- Fruit blue; corolla pink, urnlike 3. *V. ovalifolium*.

Fruit black; corolla depressed-globose.

- Leaves entire or nearly so 4. *V. oblatum*.

- Leaves finely serrate 5. *V. membranaceum*

Low, less than 5 dm. high.

Stems strongly angled, fruit red or blackish, leaves small

- Fruit red; leaves less than 1 cm. long 6. *V. scoparium*.

- Fruit purplish-black; leaves over 1 cm. long 7. *V. oreophilum*.

Stems terete, or if angled, leaves large; fruit blue.		
Plants pubescent, anthers awnless	8	<i>V. canadense</i> .
Plants glabrous or nearly so, anthers awned		
Slender, fruit small leaves serrulate	9.	<i>V. cæspitosum</i> .
Stout, fruit large.		
Leaves entire	10.	<i>V. uliginosum</i> .
Leaves serrate	5.	<i>V. membranaceum</i> .
Leaves evergreen filaments hairy, anthers awnless.		
Tall, erect	11.	<i>V. ovatum</i> .
Low, prostrate.	12.	<i>V. Vitis-Idæa</i> .

1. ***V. Oxycoccus* var. *intermedium*** Gray. (CRANBERRY). Stems very slender; leaves 6-15 mm. long, slightly revolute, glaucous beneath; pedicels 2-10; filaments half as long as the pink corolla segments; berry red, 8-10 mm. in diameter. Peat bogs; Alaska to Wn.

2. ***V. parvifolium*** Smith. (RED BILBERRY OR HUCKLEBERRY). Tall, 1-2 m. high, the branchlets angled, leaves glabrous, oval, entire, (or the small basal ones serrate and evergreen), mucronulate, 1-2 cm. long; flowers solitary on pedicels 4-9 mm. long, appearing after the leaves; corolla greenish or reddish, depressed globular, 4 mm. long; calyx with short, obtuse lobes; anthers awned; fruit red, pleasantly acid. Woods, V. I. and west of the Cascades; Alaska. In open situations the plant becomes dense in habit, with stems, leaves and flowers reddish.

3. ***V. ovalifolium*** Smith. (TALL BLUE BILBERRY). Tall, 1-4 m. high; leaves glabrous, entire; (or occasionally serrulate towards the base), oblong to oval, 2-5 cm. long, twigs slender, terete; flowers solitary, appearing before the leaves; corolla ovoid, 5-7 mm. long, pink, on pedicels 2-5 mm. long; calyx barely lobed; anthers awned; fruit blue, with more or less bloom, finely erect, globose, 8-15 cm. in diameter, acid. Cool woods, Coast to Rockies; Alaska.

4. ***V. oblatum***. Tall, 1-4 m. high, twigs angled, not very slender; leaves 2-5 cm. long, oblong to oval, usually serrulate towards the base, mucronulate; corolla depressed-globose (much flattened) reddish or greenish, 5-8 mm. broad, the style often exserted; fruit blue-black with little or no bloom, rather sweeter than that of *v. ovalifolium*, becoming erect, on pedicels 4-10 mm. long. Vancouver; Prince Rupert. This plant, intermediate in many respects between *v. ovalifolium* and *v. parvifolium*, and occurring with them, may be a hybrid; but the corolla has a distinctive character, as has also the black fruit.

5. ***V. membranaceum*** Dougl. (MOUNTAIN BILBERRY). About 5-6 dm. high, branchlets slightly angled; leaves sparingly pubescent, sharply and finely serrate, ovate or oblong, acute; flowers solitary, corolla depressed-globose on pedicels as long, calyx-limb nearly entire, fruit erect, purple-black, depressed-globose, about 1 cm. in diameter, much sweeter than that of the preceding species. Mts. 4000-6000 feet alt.; Revelstoke. Closely allied is ***V. globulare*** Rydb. Corolla depressed globose, berry purplish, 6-8 mm. in diameter. Rockies.

6. ***V. scoparium*** Leiberg. (RED ALPINE BLUEBERRY). Low and slender, 1 dm. or so high; branches numerous, sharply angled, green; leaves 7-15 mm. long, glabrous, ovate or oval, thin, shining, serrate, conspicuously reticulate-veiny, the midrib prominent; flowers solitary, limb of calyx almost entire, corolla globular-ovoid, anthers awned, berries small, red, nodding. (*V. erythrococcum* Rydb.) Mts. Cascades to Rockies.

7. ***V. oreophilum*** Rydb. Similar; slender, 1-2 dm. high; leaves 1-3 cm. long, minutely serrate, corolla globular; calyx limb almost obsolete; berry blue-black or black. Mts. Cascades to Rockies; Lake Louise.

8. ***V. canadense*** Kulm. (VELVET-LEAF OR CANADA BLUEBERRY). Low, 1-5 dm. high, branches and leaves pubescent; leaves oblong-elliptical, entire, becoming 2 cm. or more long, flowers in clusters (terminal on young plants) urceolate, calyx-lobes deltoid; fruit blue, sometimes nearly black, with much

bloom, obovoid, 6-10 mm. in diameter; flowering and ripening fruit about 2 weeks earlier than *V. uliginosum* var. *mucronatum*, which often grows with it. Peat bogs and wet ground, Fraser Delta; Nakusp; and northw.

9. *V. cæspitosum* Mich. (DWARF BILBERRY). Nearly glabrous, tufted, 5-30 cm. high; leaves obovate, obtuse or acute, some of them cuneate, 1-1.5 long, serrulate, the teeth mucronulate; flowers solitary; corolla pink, ovoid, 3-5 mm. long; berries small, blue, sweet. Dry, open situations, Victoria; in the mountains, Glacier; Rossland, etc.; Alaska.

10. *V. uliginosum* L. (BOG BILBERRY). Stout and spreading, 2-5 dm. high; leaves thickish and firm, glaucescent, entire, obovate or oblong, slightly pubescent beneath; flowers single or 2-3 together, almost sessile, the parts of the flower mostly in 4's; stamens 8-10; corolla urceolate; calyx-lobes short-ovate; fruit dark blue-black with bloom. Alaska to Quebec. Var. *mucronatum* Herder. Leaves slightly mucronate, conspicuously reticulate-veined; parts of the flower in 5's; fruit globose (sometimes in an apparently distinct form, ellipsoidal) 8-15 mm. in diameter. Fraser Delta; Alaska.

11. *V. ovatum* Pursh. (EVERGREEN HUCKLEBERRY). Erect, 1-2.5 m. high; twigs pubescent; leaves ovate, serrate, thick, acute, 2-3 cm. long; flowers in axillary clusters, corolla rose; filaments flat and broad, very hairy; anthers awnless, prolonged into a long tube; fruit black. Dry woods, Mayne Is.; V. I.

12. *V. Vitis-Idæa* L. var. *minus* Lodd. (ROCK CRANBERRY). Low, 1-2 dm. high, often matted; leaves obovate, obtuse, slightly revolute, serrulate, thick, about 1 cm. long, with black dots or points beneath; flowers in terminal clusters, fragrant; corolla rose, open-campanulate, 4-lobed; anthers awnless, prolonged into a long tube, filaments short; fruit red. Rockies; Lake Louise; Alaska.

3. PYROLA (WINTERGREEN)

Low, glabrous perennials with rootstocks; leaves thick, evergreen, mainly basal, sometimes wanting; flowers racemose, rather large, or small in the first section; calyx 5-parted persistent; petals 5 separate or nearly so, spreading or connivent; stamens 10, filaments naked; inverted and opening by pores in the seeming apex; capsule 5-lobed, loculicidal; style 1, stigmas indistinctly 5-lobed; seeds minute. (L. dim. of *pyrus*, a pear-tree).

Style straight; stigma capitate, broader, petals erect, anthers not beaked at apex.

Style exerted 1. *P. secunda*.

Style included 2. *P. minor*.

Style curving, stigma narrower than the style, petals spreading, anthers usually beaked by a contraction below the pores.

Plants leafless 3. *P. aphylla*.

Plants with green basal leaves.

Leaves thin, flowers whitish or pinkish 4. *P. elliptica*.

Leaves thick, sharply and clearly denticulate only in No. 7.

Flowers pale.

Leaves mottled 5. *P. picta*.

Leaves not mottled.

Leaves spatulate 5a. *P. picta dentata*.

Leaves orbicular 6. *P. chlorantha*.

Flowers reddish.

Leaves ovate-elliptical 7. *P. bracteata*.

Leaves round to reniform-elliptical 8. *P. asarifolia*.

1. *P. secunda* L. Stems 1-2 dm. high; leaves ovate to elliptical, or some of them orbicular, sometimes mucronate, 2-3 times as long as the petiole, denticulate; racemes one-sided, dense; bracts ovate; calyx-lobes ovate, obtuse, short, corolla oblong, greenish-white, style exerted, anthers broadest at the wide orifice. Common, dry woods, Atlantic to Pacific; Alaska.

2. *P. minor* L. Scape 0.5-2 dm. high, leaves roundish, slightly crenulate, mostly longer than the margined petiole; flowers small, not secund, white or rose; sepals triangular-ovate, corolla globose. Alaska southw. to Wash.; Rockies; Agassiz.

3. *P. aphylla* Smith. Leafless; scapes angled, reddish from a deep scaly-toothed rootstock; scaly at base, the scales sometimes bud-bearing in the axils; flowers red, sub-second, pedicels as long as the flowers with a small bract much shorter than the pedicel; lobes of calyx ovate, acute, $\frac{1}{3}$ as long as the pistils; pores of the anthers tubular, filaments dilated at base. Woods near coast; Mt. Finlayson, V. I.; Mayne Is.

4. *P. elliptica* Nutt. About 2.5 dm. high; stem more or less bracteate; leaves elliptical or obovate, obscurely crenulate, the blade 3-7 cm. long, a little longer than the margined petiole; raceme loosely few- to many-flowered; calyx-lobes ovate, acutish or blunt, short; bracts half as long as the slender pedicels; anther cells not much, if at all, contracted below the pore. Woods, Coast, eastw.; V. I.; Port Haney.

5. *P. picta* Smith. Scapes 1.5-3 dm. high; few- to many-flowered; leaves ovate, elliptical, abruptly or gradually contracting to the petiole; the blades 2.5-4.5 cm. long, often mucronate, slightly revolute, entire or denticulate; petals 4-5 mm. long, greenish-white; sepals short, broadly ovate, acutish or blunt; anthers beaked; bracts $\frac{1}{2}$ - $\frac{1}{4}$ as long as the pedicels. Dry woods V. I. to Rockies; Nakusp. Var. *dentata* (Smith) Piper. Leaves spatulate-oblong, not glaucous, tapering to a short petiole; blunt or even retuse. Cameron Lake, V. I., with the species. Both of these may have petals tinged with pink when growing in the sun.

6. *P. chlorantha* Swartz. Stems 1-5, 1.5-2.5 dm high, often with a small leaf; leaves sometimes absent, orbicular, or reniform 0.8-2.5 cm. wide, sometimes retuse, dull, veiny above, entire or minutely denticulate, flowers 1-10, nodding, about 1.5 cm. broad; bracts half as long as the pedicel; petals greenish-yellow, sepals short, ovate, obtuse, anther beaked; style hardly 1 cm. long. Dry woods, coast eastw.; Elgin; Sicamous, and northw.

7. *P. bracteata* Hook. Scapes more or less bracteate below, 1.5-4 dm. high, many-flowered; leaves ovate to elliptical, denticulate, rounded, or very short-pointed, the blades 4-8 cm. long, shorter than the petioles, sometimes slightly mottled along the veins; bracts equaling or longer than the pedicels, which are shorter than the flower, petals 6-8 mm. long; sepals lanceolate, acute, more than half as long. Flowering earlier than *P. picta* with which it sometimes occurs on V. I. Coast to Kootenay Lake.

8. *P. asarifolia* Michx. Leaves broadly elliptical to round or reniform, sometimes subcordate, thinner, but coriaceous, shining, crenate rather than denticulate; scapes 1-4 dm. high, bracted below, the bracts of the inflorescence ovate-lanceolate, a little longer or shorter than the pedicels; flowers much as in the former, but the calyx-lobes are triangular ovate, acute and much shorter. Damp woods V. I. eastw., Summerland, Field. In deep shade petals and sepals almost white. Var. *uliginosa* (T. & G.) Leaves elliptical to suborbicular, usually acutish at base. Victoria; Skeena Valley; Banff.

4. MONESES (SINGLE DELIGHT)

Stems low, leafless; flower solitary, filaments naked, anthers as in *Pyrola*, but 2-horned; stigma large, peltate, 5-lobed; style straight; the parts of the flower sometimes in 4's; valves of the capsule hairy on the edges. (Greek *monos*, single, *esis*, delight).

1. *M. uniflora* (L.) Gray. (ONE-FLOWERED PYROLA). Evergreen, less than 1 dm. high, leaves basal or near the base; scape 1-2-bracted, flower very fragrant, about 1.5 cm. broad; petals white (or rose) much longer than the ciliate sepals. Woods, Atlantic to Pacific. Usually considered a monotypic genus. There are, however, 2 somewhat intergrading forms: *M. uniflora* L. Leaves sub-orbicular, crenate-serrate, not strongly veined; capsule 7-8 mm. thick. Alaska to N.Y.; Skeena Valley; Field. *M. reticulata* Nutt. Leaves ovate to oval-orbicular, often acutish, serrate, mostly strongly veined, capsule about 1 cm. thick. Alaska to Wn.; Skeena Valley; Vancouver.

Stems low, leafy, from rootstocks; leaves somewhat whorled or alternate, thick, shining; flowers in corymbs, petals spreading, filaments enlarged and hairy in the middle, anthers as in *Pyrola*, but somewhat horned, style short, stigma broad. (Greek *cheima*, winter, *philein*, to love).

Bracts linear, deciduous	1. <i>C. umbellata</i> .
Bracts roundish	2. <i>C. Menziesii</i> .

1. **C. umbellata** (L.) Nutt. (PRINCE'S PINE). Stout, erect, 1-2.5 dm. high; leaves oblanceolate, cuneate at base, short-serrate, whorled, shining, 3-7 cm. long; flowers few to 8, pinkish, sepals ciliate; filaments hairy on the edges; petals reddish. Open woods, Atlantic to Pacific; Howe Sound.

2. **C. Menziesii** Spreng. Slender, 0.8-2 dm. high; leaves ovate-elliptical, acute at base, 2-3 cm. long, serrate, dull; flowers 1-3, dull-white; filament villous in the middle, sepals not ciliate. Deep woods, Coast Region; Vancouver.

Shrubs; leaves evergreen, alternate, fragrant; flowers white, in terminal corymbs, from scaly buds; calyx 5-parted; petals distinct, spreading; stamens 5-10, anthers small, opening by pores; capsule septicidal. (Greek *ledon*, the Rock Rose).

1. **L. groenlandicum** Oeder. Stout, 0.3-1.3 m. high; leaves oblong to linear-oblong, strongly revolute, clothed with red wool beneath, obtuse, mucronulate, 2-6 cm. long; stamens 5-7, capsule slender, subcylindrical, acutish. (*L. latifolium*) Bogs, common; Alaska to Oregon.

2. *L. palustre* L. Lower, at most 6 dm. high; leaves narrowly linear, revolute, woolly beneath, 1-3 cm. long, stamens 7-11, capsule ellipsoidal-ovoid. Arctic southward in mts. to Banff, Alberta.

3. **L. glandulosum** Nutt. Stout, 0.3-1.5 m. high, leaves oblong or oval, 2-8 cm. long, hardly revolute and not woolly, glaucous and resinous-dotted beneath; inflorescence often compound, capsule oval, retuse. Mts., Okanagan; Rockies; Field.

Erect or ascending shrubs; leaves alternate, deciduous; flowers solitary, sepals nearly distinct, $\frac{2}{3}$ as long as the petals, stamens 10, the filaments with dilated bases, anthers opening by a large pore; style curving and annular below the stigma, as in *Pyrola*; capsule septicidal. (Greek *klados*, a branch, *thamnos*, a shrub).

1. **C. pyrolæflorus** Bong. About 1 m. high; bark exfoliating; leaves oblong, 1.5-3 cm. long, apex rounded, mucronate, at base acute, corolla rotate, petals 1 cm. long, distinct or nearly so, copper-colored. Coast Mts.; Grouse Mt., Vancouver; Alaska.

Trees with red, exfoliating bark; leaves alternate, evergreen, coriaceous; flowers white, in large panicles; corolla globose, anthers awned; stamens 10; ovary 5-celled, becoming a rough, berry-like fruit. (The Latin name).

1. **A. Menziesii** Pursh. Leaves 7-10 cm. long, glabrous, entire or nearly so; panicle tomentose-pubescent; the roundish calyx-lobes not half as long as the corolla. The bark smooth in young trees, becomes rough near the base in old ones. Coast and V. I.

Shrubs, leaves alternate, coriaceous, entire, usually evergreen; flowers ovoid, bracteate, in small clusters, calyx small, deeply 4-5-parted, anthers awned; fruit a berry. (Greek *arktos*, a bear, *staphyle*, a bunch of grapes)

1. **A. alpina** (L.) Spreng. Depressed; leaves deciduous, thin, obovate 1.5-2.5 cm. long, serrate, wrinkled, strongly veined; fruit red, juicy, edible. Rockies; Yoho; Alaska.

2. **A. uva-ursi** Spreng. (KINNIKINICK). In depressed patches; twigs minutely puberulent; leaves obovate, thick, evergreen, glabrous; flowers few, corolla pink; fruit red, smooth, dry, hardly edible. Common; Alaska to Cal.

3. **A. media** Greene. Procumbent, with leafy ascending branches, 3-6 dm. high; leaves obovate-cuneiform, about 2.5 cm. long, puberulent beneath, paler. A hybrid between Nos. 2 and 3. V. I., Paisley Is.

4. **A. tomentosa** Dougl. Erect, 1-3 m. high; twigs white-tomentose; leaves ovate or oblong, about 3 cm. long, mucronate, more or less tomentose when young, sometimes becoming glabrate; flowers many, whitish; fruit depressed-globose, hirsute. Rocky hillsides, Coast; V. I.; Howe Sound.

10. GAULTHERIA

Shrubs with hairy twigs and alternate evergreen leaves; flowers solitary or in racemes; calyx 5-cleft; corolla urn-shaped or campanulate; stamens 10, anthers mostly awned, opening by pores; capsule 5-celled, 5-valved, enclosed when ripe by the fleshy calyx, the fruit thus berry-like. (Gaultier was a French naturalist).

1. **G. shallon** Pursh. (SALAL). Stout, erect, 2-18 dm. high; leaves ovate-oblong, serrate, 3-7 cm. long, cordate or rounded at base, short-pointed; flowers in glandular racemes, corolla ovoid, 5-8 mm. long, glandular-pubescent; anthers 4-awned, filaments hairy; fruit a purple berry. Coast; Vancouver.

2. **G. ovatifolia** Gray. (WESTERN TEABERRY). Rather slender, branches hirsute, depressed, with ascending branches 1-2 dm. high; leaves ovate, rounded or subcordate at base, serrulate, acute or obtuse, 1.5-3 cm. long; flowers solitary; corolla campanulate, open, white or pink, glabrous, twice as long as the calyx; anthers awnless, filaments nearly glabrous; fruit scarlet. Mts. Coast to Rockies; Revelstoke; Rossland.

3. **G. myrsinites** Hook. (MOUNTAIN TEABERRY). Low, slender, procumbent; twigs glabrous or slightly pubescent; leaves hardly 1 cm. long, ovate or oval-orbicular, finely serrate, rounded at base; flowers solitary, the corolla depressed-globose-campanulate, little surpassing the calyx; fruit scarlet. Cascades; Rockies.

11. CASSIOPE (MOSS HEATHER)

Low, heath-like plants, with small, imbricated leaves, and nodding, bractless flowers; calyx of 4 or 5 nearly distinct sepals imbricated in the bud; corolla campanulate, 4-5-lobed; stamens 8-10; anthers awned, opening by pores; style thickened at base; capsule dry, globose-ovoid loculicidal, the valves 2-cleft. (Cassiope of Greek mythology).

Leaves appressed.

Leaves carinate

Leaves channeled

Leaves spreading

1. *C. Mertensiana*.

2. *C. tetragona*.

3. *C. stelleriana*.

1. **C. Mertensiana** Don. Stems with many erect branches, ascending, 2-4 dm. high; leaves carinate, 2-3 mm. long, appressed in 4 rows, the stems thus 4-angled; pedicels lateral, 4-10 mm. long, several; corolla 5-lobed, white or sometimes pinkish; calyx sometimes pink; filaments short, style very little enlarged at the base. Mt. summits, Alaska to Cal.

2. **C. tetragona** (L.) Don. Similar; leaves channeled on the back, usually puberulent when young, 2-3 mm. long; peduncles several, lateral, 10-25 mm. long, style slightly thickened below. Alaska to Wn., in the mts.

3. **C. stelleriana** DC. (ALASKA HEATHER). Leaves oblong-linear obtuse, widely spreading, flattish, obscurely serrulate, 4-6 mm. long, pedicels terminal, short, corolla 4-5 parted, style conical. Mt. Cheam; Alaska.

12. ANDROMEDA

Low shrubs with the aspect of *Kalmia*, with coriaceous, narrowly oblong, revolute, dull leaves, and small flowers in terminal corymbs; branchlets terete; calyx 5-parted, colored, as are also the pedicels; corolla urn-shaped; filaments hairy, anthers awned; capsule loculicidal. (Name from Greek mythology).

1. *A. polifolia* L. (WILD ROSEMARY; MOORWORT). Stems 2-5 dm. high, ascending; leaves glaucous beneath, acute; filaments short. Peaty swamps, V. I. eastward; Lulu Is.; Alaska.

13. PHYLLODOCE (FALSE HEATHER)

Low shrubs with narrow leaves as in Conifers, and red or greenish flowers in terminal corymbs; pedicels glandular, bracted at base, 1-2 cm. long, calyx 5-parted, corolla campanulate, 5-lobed; stamens 10, anthers awnless, opening by oblique pores, filaments glabrous; capsule septicidal, 5-valved. (Phyllococe, a sea nymph mentioned by Virgil).

1. *P. empetriformis* Don. Leaves slightly furrowed and rugose above, green beneath; corolla red, long-campanulate, many times longer than the small, ovate, obtuse, eglandular sepals, its lobes 2-3 mm. long; filaments glabrous. Mt. summits. Var. *intermedius* (Hook.) Rydb. Probably a hybrid between this and the following; corolla subglobose, pale-red or yellowish; sepals somewhat glandular, either obtuse or acute, pedicels very glandular. Rockies; Mt. Garibaldi; Yukon.

2. *P. glanduliflorus* (Hook.) Cov. Leaves lightly furrowed or rounded and rugose above, with a white, finely hairy line beneath; corolla glandular, greenish-yellow, ovoid, with short lobes, twice as long as the lanceolate, acute sepals, filaments minutely pubescent. Mt. summits; Mt. Crown, Vancouver; Sitka.

14. KALMIA (AMERICAN LAUREL)

Low, glabrous shrubs with evergreen mostly opposite coriaceous leaves, somewhat angled branchlets and showy, red flowers, calyx 5-parted; corolla 5-lobed, wheel-shaped; filaments glabrous, the anthers in pouches of the corolla; capsule septicidal. (Kalm was a pupil of Linnæus).

1. *K. polifolia* Wang. Glabrous, 2-5 dm. high; leaves linear-oblong, glaucous beneath, shining above, entire, revolute, 2-2.5 cm. long; flowers in terminal corymbs, corolla 12-20 mm. broad, sepals much smaller. Bogs, common; Alaska to Cal. (*K. glauca* Ait.) Var. *microphylla* Hook. Leaves oval, not revolute, hardly 2 cm. long. Mts.; Roger's Pass; Telegraph Trail.

15. MENZIESIA (FALSE AZALEA)

Shrubs; leaves alternate, deciduous; flowers 4-merous, stamens 8, stigma 4-lobed, corolla urn-like, fruit septicidal. (Menzies was the naturalist who accompanied Vancouver).

1. *M. ferruginea* Smith. About 2-3 m. high; odorous, buds with chaffy scales; leaves oblong-obovate, appressed-pubescent above, glaucous beneath, minutely crenate-serrate, mucronulate; flowers in corymbs, corolla copper-colored or pinkish, appearing with the leaves, somewhat persistent; stamens hairy below or glabrous. (*M. glabella*). Coast to Rockies, in moist woods; Vancouver; Alaska.

16. LOISELEURIA

A low, straggling shrub with small, opposite, evergreen leaves; calyx and campanulate corolla 5-lobed; stamens 5, opening by slits; capsule 2-3-celled, septicidal. (Loiseleur, a French botanist).

1. *L. procumbens* Desv. (ALPINE or TRAILING AZALEA). Much branched, 1-2 dm. high; leaves coriaceous, 4-5 mm. long, oblong, revolute; flowers small, pink, in small terminal clusters. Alaska southward to the 49th parallel. Mt. Garibaldi; Howe Sound; (J. Davidson).

17. RHODODENDRON

Shrubs with alternate or somewhat whorled, evergreen or deciduous leaves, and showy flowers; calyx and corolla deeply 5-lobed, the latter campanulate; stamens usually 10, opening by pores; flowers from scaly buds, capsule septi-
cidal. (Greek *rhodon*, a rose, *dendron*, a tree).

1. **R. californicum** Hook. Stems 1-3 m. high, glabrous; leaves elliptical-oblong, evergreen, glabrous, about 12 cm. long, shining above, entire; calyx small; corolla 3 cm. long, rose-colored, slightly irregular; ovary rusty-hirsute. Head waters of the Skagit, Dewdney Trail.

2. **R. albiflorum** Hook. One or two m. high; the young twigs and the petioles rusty-pubescent; leaves deciduous, about 5 cm. long, pubescent, nearly entire; calyx large, petals white; filaments hairy below. Mt. woods. Forma *poikilon* Henry. The 3 anterior petals orange- or yellow-dotted. Roger's Pass; Common on Coast Mts. opposite Vancouver.

MONOTROPACEÆ (INDIAN PIPE FAMILY)

Parasite or saprophytic plants without green leaves, stems low, scaly-bracted; flowers in spikes or racemes; flowers regular, perfect, calyx of 2-6 lobes or segments, corolla 4-5-lobed or with distinct petals, these sometimes wanting; stamens opening by pores or slits; ovary usually 5-celled, superior; seeds minute.

Ovary 4-5 celled.

Corolla wanting

Corolla gamopetalous, anthers awned 1. Allotropa.

Corolla polypetalous, anthers awnless.

Flower solitary 3. Monotropa.

Flowers several 4. Hypopites.

Ovary 1-celled, corolla gamopetalous; anthers awnless 5. Newberrya.

1. ALLOTROPA

Plant reddish, stem densely scaly-bracted with a thick base; flowers in a long, dense spike; sepals 5, round; corolla none; stamens 10; anthers opening by large pores; style very short, stigma capitate; seeds innumerable, minute. (Greek, another, *tropes*, a turn; the flowers are reflexed).

1. **A. virgata** T. & G. Stems several, 2-4 dm. high; calyx 2-bracteolate, the sepals slightly erose, shorter than the stamens. Dry woods, Cameron Lake, V. I.; Chilliwack Mts.

2. PTEROSPORA (PINE DROPS)

Stems stout, reddish, clammy, pubescent, with a scaly base, and a long spike of nodding, pediceled flowers; calyx 5-parted, corolla ovoid, persistent, of united petals; stamens 10, style short, about equaling the ovary; stigma capitate; seeds numerous with a broad wing attached at the apex. Root-parasites. (Greek *pteron*, a wing, *spora*, a seed).

1. **P. andromedea** Nutt. Under pines or firs. Nanaimo; Naramata.

3. MONOTROPA (INDIAN PIPE)

Low, fleshy, white or brownish-red, saprophytic; stems usually clustered, calyx of 2-5 scales, deciduous; petals narrow, erect, of 4-5 separate petals; stamens 8-10; stigma disk-like, style thick; capsule 4-5-celled; seeds innumerable, minute. (Greek *monos*, one, *tropos*, turn, the summit of the stem being turned to one side).

1. **M. uniflora** L. (INDIAN PIPE). Flowers odorless, solitary, nodding, 1.5 cm. long; stem and flower white, turning black; the stem bracted, 1-2.5 dm. high; anthers reniform, opening by 2 transverse chinks; style short, stigma funnel-form, naked. Coniferous woods. Atlantic to Pacific; Vancouver; Alaska.

4. HYPOPITES (PINESAP)

Stem scaly; yellowish or brownish, flowers several, in a short, nodding raceme, the terminal one 5-merous, the rest 3-4-merous; anthers opening by a line, style longer than the ovary, stigma ciliate. (Greek *hypo*, under, *potys*, a fir tree, in allusion to the habitat).

1. *H. Hypopites* (L.) Small. Stems 1-2 dm. high; bracts ovate-lanceolate, entire or slightly erose, flowers 3-20 in a pubescent, rather close raceme. Mt. woods, Coast eastward; North Vancouver. (*H. multiflora*).

2. *H. fimbriata* (Gray) Howell. Similar; the upper bracts obovate to cuneate, erose or laciniately fimbriate. Trout Lake; Kootenay.

5. NEWBERRYA

Low, fleshy, pink or reddish-brown plants with densely scaly stems; the flowers in a dense terminal cluster; calyx of 2-4 bract-like sepals, corolla gamopetalous, pubescent, 4-5 lobed; persistent stamens 6-10, filaments hairy above the middle, anthers opening from base to apex; ovary 1-celled, hairy, with 4-8 parietal placentæ.

1. *N. congesta* Torr. Saprophytic, stem clavate, 0.5-1.5 dm. high; scales erose-ciliate, corolla-lobes 4, one-third as long as the tube, stamens 6-8, placentæ about as many; styles shorter than the ovary. Grouse Mt., Vancouver (J. Davidson); Renfrew District, V.I.

PLUMBAGINACEÆ (LEAD-WORT FAMILY)

Perennial herbs with clustered, regular flowers; calyx tubular, 5-toothed; petals red, 5, nearly or quite distinct, stamens 5, opposite the 5 petals, hypogynous; ovary free, 1-celled, 1-seeded; styles 5.

1. STATICE (THRIFT. SEA-LAVENDER)

1. *S. Armeria* L. Tufted, scapes 1-3 dm. high, leaves linear, rather fleshy, 2-7 cm. long; flowers in a terminal head, 2-3 cm. in diameter, subtended by scarious bracts, the 2 lowest bracts more or less united and reflexed; calyx scarious. (*Armeria vulgaris*). Near the shore, Victoria; Arctic shores.

PRIMULACEÆ (PRIMROSE FAMILY)

Herbs with simple leaves; stamens as many as the lobes of the corolla, and inserted opposite them; ovary 1-celled with a free central placenta; style and stigma 1.

Stemless, leaves all basal.

Corolla-lobes reflexed

1. Dodecatheon.

Corolla-lobes erect or spreading.

Corolla-tube shorter than the calyx, constricted at the throat

2. Androsace.

Corolla-tube equaling or longer than the calyx.

Corolla open at the throat, the lobes obcordate or emarginate

3. Primula.

Corolla crested at throat, lobes entire

4. Douglasia.

Stems leafy.

Ovary adnate at base to the calyx, staminodia usually present

5. Samolus.

Ovary wholly free.

Flowers sessile or in clusters.

Flowers in axillary spikes, punctate

10. Lysimachia.

Flowers solitary in the axils.

Corolla wanting, capsule dehiscent by valves

9. Glaux.

Corolla present, minute; capsule circumscissile

6. Centunculus.

Flowers with long peduncles.

Plant spreading or procumbent, flowers salmon-color, capsule circumscissile

7. Anagallis.

Plants erect, capsule dehiscent by valves.

Low, flowers white or pink

8. Trientalis.

Tall, flowers yellowish

11. Steironema.

1. DODECATHEON (AMERICAN COWSLIP. SHOOTING STAR).

Acaulescent perennials with mostly entire leaves, and large red or white umbellate flowers, terminating the scape; calyx reflexed in flower, erect in fruit; corolla-tube short, the ample lobes strongly reflexed; anthers much longer than the filaments, which sometimes form a tube. (Greek, meaning the *twelve gods*, as under their care).

Flowers white, leaves dentate	1. <i>D. dentatum</i> .
Flowers red, leaves entire or nearly so.	
Filaments united into a yellow tube, capsule dehiscent by valves.	
Plants glabrous throughout	2. <i>D. pauciflorum</i> .
Plants puberulent	3. <i>D. puberulum</i> .
Filaments separate, black, capsule circumscissile.	
Filaments very short, flower 4-merous	4. <i>D. tetrandrum</i> .
Filaments 2 mm. long or more, flowers 5-merous.	
Plant glabrous throughout	5. <i>D. conjugens</i> .
Inflorescence glandular-puberulent.	
Leaves ovate to elliptical	6. <i>D. latifolium</i> .
Leaves oblanceolate, crenate	7. <i>D. Jeffreyi</i> .

1. ***D. dentatum*** Hook. Glabrous throughout; leaves ovate, irregularly dentate, abruptly contracted to a margined petiole; scape 1-2 dm. high, few-flowered; calyx-lobes short; lobes of the corolla white, with 2 purple spots near the base, about 1 cm. long; filaments very short, anthers 2-toothed at the apex; capsule but little longer than the calyx, opening by valves. Cascade Mts., lat 49°. (Lyall.)

2. ***D. pauciflorum*** (Durand) Greene. Glabrous throughout, calyx and stem sometimes dotted with red; leaves 5-15 cm. long, oblanceolate, erect, mostly obtuse; calyx-lobes longer than the tube; corolla purplish, the base yellow with a scalloped orange ring; the lobes oblong or narrowed below the middle, 1-2 cm. long; stamen-tube about half as long as the anthers; pod ovoid, longer than the calyx; seeds dark, prismatic. Grassy places, Victoria; Nanaimo; Bowen Island; Rockies.

3. ***D. puberulum*** (Nutt.) Piper. Puberulent throughout, 1-3 dm. high; leaves oblanceolate, acute or obtuse, scapes few-flowered; the inflorescence glandular; corolla about 1 cm. long, the lobes oblong to lanceolate, purple, the base yellow with scalloped purple ring; stamen-tube orange, half as long as the anthers; anthers purple or yellow, with purple connective; pod ovoid, hardly longer than the calyx. Dry hillsides; Lytton; Kamloops; Pentiction; Arrowhead.

4. ***D. tetrandrum*** Suksdorf. Stout, glabrous except the inflorescence; leaves oblanceolate acute, entire or denticulate, 1-2 dm. long, tapering to a winged petiole; umbel few-flowered, calyx obtuse or acute, corolla purplish with a yellowish ring at base, about 1.5 cm. long, lobes lanceolate, anthers, and very short filaments separate, purple; petals crested at base. Ucluelet, V. I. An incomplete specimen from V. I. is referred here; it will doubtless prove to be distinct from *tetrandrum*.

5. ***D. conjugens*** Greene. Short crown with a dense fascicle of fleshy roots that are deciduous from it after flowering; glabrous; leaves obovate to lanceolate, 5-14 cm. long; scape stoutish, 1-2 dm. long, few-flowered, corolla rose-purple, sometimes white; anthers distinct, obtuse, the connective acuminate; capsule cylindrical. Resembling *D. pauciflorum*, but with longer flowers and the connective of the anthers rugulose and acuminate. Lower valleys of the Rockies.

6. ***D. latifolium*** (Hook.) Piper. Glabrous, except the glandular inflorescence, leaves ovate to elliptical, spreading, 6-10 cm. long, including the margined petiole; scape 1-3 dm. high, many-flowered; calyx-lobes acuminate, longer than the tube; corolla 15-18 mm. long, rose-purple, the base whitish-yellow, marked with a purple scalloped line; capsule much longer than the calyx, ovoid-cylindrical; seeds yellow. Grassy places; Victoria; Alaska.

7. D. Jeffreyi Moore. Glabrous except the glandular inflorescence; leaves oblanceolate, erect, 1-2 dm. long, acutish, mucronate; scapes 3 dm. high, many-flowered; corolla large, stamens usually 4, the anthers emarginate; capsule not surpassing the calyx. Wet places in the mts. of the interior; Alaska.

2. ANDROSACE

Low, slender herbs, with a small tuft of basal leaves, and small clustered or umbellate flowers; calyx 5-cleft, or lobed, carinate; corolla salver- or funnel-form; capsule 5-valved, few-to many-seeded. (Greek *andros*, of a man, *sakos*, a shield).

Perennial, umbel capitate	1. <i>A. carinata</i> .
Annuals, umbel open.	
Bracts of involucre ovate or oblong	2. <i>A. simplex</i> .
Bracts of involucre narrow.	
Pedicels unequal	3. <i>A. diffusa</i> .
Pedicels equal	4. <i>A. septentrionalis</i> .

1. A. carinata Torr. Less than 1 dm. high; caudex short-branched; leaves oblanceolate, about 8 mm. long, ciliate, entire; scape and umbel sparingly lanate, calyx-lobes longer than the tube; corolla creamy with a yellowish eye, the lobes obovate, exceeding the calyx. (*A. chamaejasme* Gray). Alpine; Rockies; Alaska.

2. A. simplex Rydb. Scapes usually solitary, very slender, 2-7 cm. high, bearing a 1-4-flowered umbel, with nearly erect pedicels, 5-15 mm. long, calyx-tube about 2 mm. long, longer than the lanceolate lobes; corolla small, shorter than the calyx. Lytton; Spence's Bridge.

3. A. diffusa Small. Scapes 2-10 cm. long, often diffusely branched at the base; leaves oblanceolate to nearly linear, 1-4 cm. long, serrulate or entire, puberulent; pedicels very unequal, often longer than the peduncle, corolla white or pink, the lobes oblong, sometimes retuse, hardly exceeding the calyx; calyx-lobes glabrous, shorter than the capsule. Rocky soil. Rockies.

4. A. septentrionalis L. Scape strict, glabrous, 8-20 cm. high; leaves slightly puberulent, oblanceolate, denticulate or entire, inflorescence umbel-like, the pedicels nearly equal; corolla exceeding the calyx; lobes of the calyx shorter than the tube; corolla small, whitish; capsule shorter than calyx-lobes. Grassy banks, Alaska southward and eastward. Crow's Nest Pass.

3. PRIMULA (PRIMROSE)

Perennial herbs with leaves basal and flowers in umbels; calyx somewhat angled, 5 toothed; corolla funnel or salver-form, tube equaling or longer than the calyx; its lobes obcordate or emarginate; stamens 5, short, capsule 5-valved, many seeded. (Latin *primus*, first, in allusion to spring-flowering).

1. P. americana Rydb. Scapes 1-2 dm. high; leaves spatulate or oblong, crenulate-dentate, usually white-mealy beneath, 2.5-8 cm. long; pedicels in flower little exceeding the bracts; calyx 6-8 mm. long, the lobes obtuse, corolla lilac with a yellow eye, the tube slightly exceeding the calyx. Rockies especially on the eastern slope, in swamps or wet places.

2. P. Maccalliana Wiegand. Similar; rather smaller, 0.8-1.5 dm. high, leaves 2-2.5 cm. long, spatulate or cuneate, more or less mealy beneath; pedicels much longer than the bracts; calyx about 6 mm. long, the lobes acute, corolla pale-pink, bluish or lavender, with a yellow eye. The common primrose of the Rockies and Selkirks in swamps or wet places.

3. The garden primroses. (a) Leaves smooth, fleshy. **P. auriculata**. (b) Leaves rugose. (1) Umbel radical. **P. vulgaris** (Common or English Primrose). (2) Umbel on a scape. **P. officinalis**. The last is a garden escape, Victoria.

4. DOUGLASIA

Low tufted herbs with suffrutescent stems and solitary or umbellate flowers; calyx campanulate, 5-lobed; corolla-tube equaling or exceeding the calyx, the throat more or less contracted and 5 crested beneath the sinuses; stamens included; capsule turbinate, 1-2 seeded. (David Douglas d. 1834, made extensive botanical exploration in the North West).

1. **D. montana** Gray. Cæspitose; leaves subulate, minutely ciliate, about 4 mm. long; peduncles solitary, 1-flowered, corolla-tube equaling the calyx. Mts., Montana; perhaps B. C.

2. **D. nivalis** Lindl. Similar but with flowers in umbels, and the whole plant puberulent. Near the sources of the Columbia.

5. SAMOLUS (BROOK-WEED)

A low glabrous plant with alternate leaves and small white flowers in racemes; stamens 5, staminodia 5 or none; style slender, capitate; capsule globose, opening by 5 valves; seeds many, minute. (A Celtic name, referring to curative qualities for swine).

1. **S. floribundus** H. & R. Diffusely branched, 1-3 dm. high; leaves obovate or spatulate; pedicels filiform, bracteolate near the middle. Wet places, possibly on our S. E. boundary.

6. CENTUNCULUS (CHAFF-WEED)

A low, glabrous annual with alternate leaves and minute axillary flowers, with rotate corollas; stamens 4 or 5, beardless. (Latin dim. of *cento*, a patch, in allusion to its manner of growth).

1. **C. minimus** L. Stem ascending, 3-8 cm. long; leaves obovate; flowers nearly sessile, mostly 4-merous. In a pond, Kamloops; wet place; Mayne Is. (J. Davidson).

7. ANAGALLIS (PIMPERNEL)

A low spreading annual with opposite leaves and axillary flowers on long peduncles; calyx-lobes linear; corolla rotate, the tube very short; stamens 5, bearded; capsule globose, many-seeded. (Greek, *ana*, again, *agallein*, to delight).

1. **A. arvensis** L. Leaves ovate, sessile, shorter than the peduncles; petals minutely fringed with stalked glands; flowers 7-12 mm. broad. Introd. Occasional, Vancouver, Victoria.

8. TRIENTALIS (CHICKWEED-WINTERGREEN)

Low perennials from tuberous rootstocks with simple stems, the leaves mostly in a whorl near the top of the stem; corolla flat, with no tube; filaments united at the base; capsule few-seeded. (A Latin name meaning the third part of a foot).

1. **T. latifolia** Hook. (STAR FLOWER). Glabrous, 1-2 dm. high, from a large corm that may be pulled up with the plant; stems bracted, leaves all in a terminal whorl, elliptical acute at both ends; pedicels hardly glandular, filiform, shorter than the leaves; flowers several, pinkish, 10-14 mm. broad. Woods, common in the coast region.

2. **T. arctica** Fisch. Glabrous, 0.7-2 dm. high; stem more or less leafy, obscurely whorled at the top, from a small corm that breaks off readily; leaves obovate to elliptical, rather shorter than in the former, and more acute at the base; corolla white, 12-18 mm. broad, the lobes bristle-tipped, pedicels often longer than the leaves, and glandular. Wet, mossy places in the coast region and in the mts.; Alaska,

9. GLAUX (SEA MILKWORT)

A low perennial with opposite entire fleshy leaves, and sessile axillary white or pinkish flowers; calyx bell-shaped, corolla none; capsule 5-valved, few-seeded. (Greek *glaukos*, sea-green).

1. *G. maritima* L. Branches diffuse, prostrate or ascending, 5-20 cm. high; leaves linear to oblong, 2-13 mm. long; capsule 2.5 mm. broad. Saline soil in the interior, and sea-shores. Var. *obtusifolia* Fernald. Erect, 5-30 cm. high, simple or with a few erect branches; leaves broadly oblong, rounded at apex, 8-17 mm. long; capsule 2.5-4 mm. broad. Vancouver, Alaska.

10. LYSIMACHIA (LOOSESTRIFE)

Tall, leafy-stemmed perennials with dotted foliage; corolla rotate, deeply 5-7-parted into linear, dotted segments; filaments distinct (in ours); leaves opposite, the lower scale-like. (Greek *lusis*, release, *mache*, strife).

1. *L. thysiflora* L. Stems simple, 3-6 dm. high; leaves long, linear to lanceolate, the middle pairs with peduncled, globose or cylindrical clusters of light-yellow flowers; capsule globose, dotted. Wet places, common. Vancouver; Okanagan Valley; Alaska.

11. STEIRONEMA

Perennials, leaves opposite or in whorls of 4, the petioles ciliate; corolla yellow, rotate, without tube, the lobes erose; filaments distinct. (Greek *steiros*, sterile, *nema*, a thread, in allusion to sterile stamens).

1. *S. ciliatum* (L.) Raf. Erect, simple or branching, 4-12 dm. high; leaves cordate-ovate to lanceolate, minutely ciliate; flowers on filiform pedicels. Damp thickets, common; Matsqui; Okanagan Valley.

GENTIANACEÆ (GENTIAN FAMILY)

Bitter, glabrous herbs; flowers perfect, regular; calyx persistent, 4-5-cleft or lobed; corolla 4-5 lobed, the stamens alternate with the lobes; ovary 1-celled, with 2 parietal placentæ; stigma mostly 2-lobed; seeds many.

Terrestrial; leaves entire.

Style filiform, flowers pink. 1. *Centaureum*.

Style short or none, flowers yellow or blue.

Flowers spurred 2. *Halenia*.

Flowers not spurred 3. *Gentiana*.

Aquatic; leaves not entire; corolla whitish 4. *Menyanthes*.

1. CENTAURIUM (CENTAURY)

Low, annuals or biennials; leaves entire, sessile; flowers many, in cymes or spikes; corolla tubular, 4-5-lobed, funnel-form or salver-form; calyx with 4-5 slender lobes; anthers twisted spirally in age; style deciduous. (Latin *centum*, a hundred, *aurum*, gold, in allusion to its great medicinal value).

1. *C. Muhlenbergii* Griseb. Annual, 1-2.5 dm. high; branching from the base, without a basal rosette; leaves oblong, sessile, obtuse, entire, the upper linear; flowers sessile in small cymes, or the lateral on bibracteate pedicels, corolla salver-shaped, the tube yellow, the limb pink, expanding to the breadth of 1 cm. in bright sunshine; seeds minute. Introd.; Vancouver. Flowering in Autumn.

2. HALENIA (SPURRED GENTIAN)

Calyx 4-5-parted; corolla without plaits, prolonged at base under the erect lobes into spurs; otherwise much as in *Gentiana*. (Halen was a German botanist).

1. *H. deflexa* Griseb. Annual or biennial, 1-6 dm. high; simple or branched above; lowest leaves oblong-spatulate, petioled, the others oblong-lanceolate

to ovate, acuminate; spurs curved, half the length of the 4-lobed, whitish or purplish corolla; flowers 7-8 mm. long, solitary or cymose in the axils of the upper leaves. (*Tetragonanthus deflexus*). Shady slopes, Rockies; Field; northw.

3. GENTIANA (GENTIAN)

Leaves opposite, entire, exstipulate, sometimes in basal rosettes; corolla 4 or 5-lobed, often with plaited folds which bear appendages or teeth at the sinuses; calyx-lobes usually unequal; stamens on the corolla-tube, usually extrorse; style short or none, stigmas 2; placentæ broad. (Gentius, King of Illyria, according to Pliny discovered its medicinal value).

Corolla without plaits or lobes or teeth at the sinuses; pod sessile or nearly so.

Corolla fringed in the throat at the base of the lobes.

Corolla 5-8 mm. long 1. *G. tenella*.

Corolla 10-15 mm. long 2. *G. acuta*.

Corolla not fringed in the throat.

Calyx 4-cleft 3. *G. propinqua*.

Calyx 5-lobed 4. *G. glauca*.

Corolla with entire, toothed or lobed plaits or lobes at the sinuses; pod more or less stipitate.

Leaves narrowly scarious-margined 5. *G. americana*.

Leaves not scarious-margined.

The plaits of the corolla entire or nearly so.

Corolla yellowish, plants low 6. *G. Romanzovii*.

Corolla deep-blue; plant tall, green 7. *G. sceptrum*.

The plaits of the corolla toothed or lobed.

Flowers whitish on the expanded lobes, drying yellow 8. *G. Douglasiana*.

Flowers more or less blue.

Flower solitary, involucrate 9. *G. calycosa*.

Flowers several, not involucrate.

Floral bracts narrow.

Calyx-lobes well developed 10. *G. affinis*.

Calyx-lobes none, or small 11. *G. Forwoodii*.

Floral bracts ovate 12. *G. oregana*.

1. *G. tenella* Rottb. Low, 3-10 cm. high; leaves 1 cm. long or less, oblong, or the lowest spatulate; calyx deeply parted, the lobes usually 5, ovate or oblong; corolla 5-8 mm. long, its lobes ovate-oblong, rather obtuse; 2 of the sepals broader. Alaska southward in the mts.

2. *G. acuta* Michx. (NORTHERN G.) Simple or branching, 1-6 dm. high; stem slightly winged; leaves ovate to lanceolate, acutish, 2-3.5 cm. long, the basal shorter, obtuse; 2 of the sepals broader; flowers in an open or close thyse, mostly pediceled; calyx deeply lobed; corolla yellowish with a blue limb; capsule sessile. (*G. stricta*). Moist soil, V. I. eastward. Crow's Nest Pass; Alaska.

3. *G. propinqua* Rich. (FOUR-PARTED G.) Stems clustered, slightly winged, 0.5-1.5 dm. high; basal leaves spatulate, the upper distant, oblong or ovate-oblong, 1.5-2.5 cm. long, slightly clasping; flowers mostly pediceled; calyx deeply 4-cleft, 2 of the lobes much broader; corolla 4-lobed, 4-angled in the bud, greenish-blue, 12-15 mm. long, the lobes acute or acuminate, entire or denticulate; pod nearly sessile. Rockies; Field; Alaska.

4. *G. glauca* Pall. (GLAUCOUS G.) Simple 0.5-1 dm. high; leaves elliptical-obovate, thick, obtuse, rosulate at base, 10-20 mm. long; flowers few; calyx-teeth a little shorter than the tube; corolla greenish-blue 1.2-1.8 cm. long, the obtuse lobes widened at base, the sinus entire. Mt. meadows, Mt. Garibaldi; Glacier, northward to Alaska.

5. *G. americana* Engelm. (DWARF G.) Stems weak or procumbent; 0.5-1 dm. high; leaves ovate, small, rosulate below, the margins slightly whitened; flowers solitary, 4-merous; corolla azure blue, plicate at the sinuses with broad emarginate lobes or plaits; calyx 4-toothed; pod oblong, short-stipitate. (*G. prostrata* Hook. not Hænke). Rockies; Field; Alaska.

6. **G. Romanzovii** Led. Stems often clustered, 0.5-1.5 dm. high; 1-3 flowered; leaves linear to spatulate, thickish, the cauline somewhat connate, a basal rosette remaining at flowering; calyx obconical; corolla yellowish or tinged with blue, purple-dotted, the lobes slightly spreading, the plaits entire, broad, only slightly extended at the summit; seeds lamellose-rugose. (*G. frigida* Gray. not Hænke). Alaska southward in the Rockies to Colorado.

7. **G. sceptrum** Pall. (SWAMP G.) Stems stout, 3-6 dm. high; simple or with erect branches above; leaves oblong-lanceolate, 2-5.5 cm. long; calyx-lobes unequal, 2 of them much broader; corolla about 4 cm. long, oblong-campanulate, broadest below the erect, obtuse lobes, which are not widened at base, the plaits not evident, inserted in the corolla; style deeply cleft; pod stipitate; seeds with a scarious point. Swamps in the coast region; Vancouver.

8. **G. Douglasiana** Bong (DOUGLAS'S G.) Diffusely branched from the base, 1-2 dm. high; stem-leaves few, small, ovate; the basal in rosettes, less than 1 cm. long, elliptical-oblong; corolla about 1 cm. long, the plaits and appendages conspicuous; calyx half as long, the acute lobes a little shorter than the tube; capsule obovate, flattened and 2-edged above; style short. Wet places, Oregon to Alaska; Massett; Prince Rupert.

9. **G. calycosa** Griseb. Stems 1-3 dm. high; leaves ovate, 1.5-3 cm. long, the lower pairs connate, the upper broad; flower usually solitary; calyx-lobes ovate, about equaling the turbinate tube, the appendages of the blue corolla 2-cleft, shorter than the lobes; seeds smooth, wingless. Mts. near the 49th parallel.

10. **G. affinis** Griseb. (LARGE G.) Stems clustered, 2-4 dm. high; leaves oblong to lanceolate, the upper linear-lanceolate; flowers clustered at apex and axillary; corolla 2.5-3 cm. long, funnel-form, blue, its lobes obtuse or acutish; calyx-lobes variable, linear, the longest rarely equaling the tube; the appendages small or large, 2-toothed; seeds smooth, winged. Rockies; Sask.

11. **G. Forwoodii** Gray. Similar; flowers smaller, 2 cm. long, the corolla-lobes rounder, calyx-lobes none or minute, the tube irregular, more or less lobed or cleft. Rockies, South Kootenay.

12. **G. oregana** Engelm. Stem 3-6 dm. high; leaves ovate to lanceolate, 2.5-5 cm. long; bracts oblong to ovate; calyx-lobes ovate to lanceolate, as long as the tube; corolla 2.5-3.5 cm. long, with short roundish lobes. Idaho boundary.

4. MENYANTHES (BUCKBEAN)

Leaves basal, simple or compound; flowers clustered, terminating the scape; calyx and corolla 5-lobed or parted, corolla broadly funnel-form, whitish; style exserted, lobed or capitate, persistent; ovary half inferior or superior, perennials from thick rootstocks. (Greek *men*, a month, *anthos*, a flower; in flower for a month).

1. **M. trifoliata** L. Leaves trifoliate, the leaflets entire, 6-10 cm. long; flowers in a raceme, the inner surface of the white or slightly reddish corolla densely hairy, style clavate, stigma 2-lobed. Water, Atlantic to Pacific; Vancouver; Alaska.

2. **M. crista-galli**. (DEER CABBAGE). Leaves reniform, crenate, reaching a breadth of 1.5 dm., sometimes purple, twice as broad as long; flowers in small cymes, corolla white, sometimes brownish, not hairy; stigma 2-lobed. (*Nephrophyllidium*). Wet places; Hollyburn Ridge, Vancouver; Ucluelet; Alaska.

APOCYNACEÆ

Herbs, usually with milky juice; leaves entire, opposite, exstipulate; flowers 5-merous, the stamens inserted on the corolla-tube alternate with its lobes, the pollen glandular; the 2 ovaries free and distinct, except for the united styles or stigmas, forming follicles.

Seeds naked; trailing plants 1. *Vinca*.
Seeds comose; branching, erect 2. *Apocynum*.

1. *VINCA* (PERIWINKLE)

Low, evergreen plants with solitary, axillary flowers; corolla blue, salverform unappendaged in the throat; calyx-lobes acuminate; stamens inserted about the middle of the corolla-tube; style slender, pods short, cylindrical.

1. *V. minor* L. Procumbent, leaves glossy, lanceolate-oblong, 3-4.5 cm. long; limb of corolla 2 cm. broad. A garden escape, Victoria; New Westminster.

2. *V. major* L. More erect; leaves ovate, ciliate, 5-7 cm. long; limb of corolla 4 cm. broad. A garden escape. Victoria; New Westminster; Shawnigan.

2. *APOCYNUM* (DOGBANE)

Tall herbs with milky juice, mucronate leaves, and small, cymose flowers; corolla bell-shaped, with 5 appendages in the throat; stamens on the base of the corolla-tube, the anthers slightly adhering to the stigma; style none; fruit a pair of long, slender follicles. (Greek *apo*, against, *kyon*, a dog).

Corolla pink, its lobes spreading or revolute 1. *A. androsæmifolium*
Corolla greenish-white, its lobes more erect 2. *A. cannabinum*.

1. *A. androsæmifolium* L. Branches spreading, 3-6 dm. high; leaves spreading, ovate-oblong, slender-petioled, glabrous or slightly pubescent beneath, corolla campanulate, about 6 mm. long, the blunt lobes finally recurved; calyx hardly half as long as the corolla-tube, lobes ovate. Open woods, Atlantic to Pacific. Var. *pumilum* Gray. Low, leaves orbicular-ovate. Kootenay; V. I. Var. *incanum* A. DC. Leaves with short, dense pubescence beneath. Kootenay.

2. *A. cannabinum* L. (INDIAN HEMP). Glabrous, 2-10 dm. high, simple or with ascending branches; leaves ascending, oblong or ovate-oblong; cymes many flowered; corolla tubular, about 4 mm. long; calyx nearly equaling the corolla-tube, lobes lanceolate. Sandy soil; variable, sometimes diffusely branched, with spreading leaves, when it simulates the preceding. Spence's Bridge, Sicamous. Var. *hypericifolium* Gray. Leaves of axis sessile, narrower, oblong. Kootenay.

ASCLEPIADACEÆ (MILKWEED FAMILY)

Herbs with opposite, entire, exstipulate leaves, and milky juice; flowers 5-merous; calyx free from the 2 ovaries; the 5 lobes of the corolla valvate in the bud; stamens 5, borne on the corolla-tube, their anthers attached to the stigma; pollen in waxy masses attached to the stigma by glands that alternate with the anthers; ovaries becoming follicles; seeds with a tuft of hairs.

1. *ASCLEPIAS* (MILKWEED)

Calyx-lobes small, reflexed; corolla deeply 5-parted, a crown of 5 hooded nectariferous appendages on the stamen-tube, each containing an incurved horn; filaments united into a short tube; pollen-masses attached in pairs to glands.

1. *A. speciosa* Torr. Finely canescent-tomentose perennials; stem stout, 6-15 dm. high; leaves subcordate, oval to oblong, thick, 1-1.5 dm. long; corolla whitish or purplish, the lobes ovate-oblong, about 1 cm. long, the hoods slightly longer, the truncate summit produced into a long appendage; follicles soft-spinose, tomentose, 5-10 cm. long. Damp bases of hills, east of Cascades; Spence's Bridge, eastw.

CONVOLVULACEÆ (CONVOLVULUS FAMILY)

Twining or trailing herbs with regular flowers; the corolla plaited, or twisted in the bud; stigmas 2, ovary 2-celled, sometimes becoming 4-celled; embryo coiled in mucilaginous albumen. (Latin *convolvere*, to twine).

Plants with green leaves	:	:	:	:	:	:	:	:	:	1. Convolvulus.
Leafless, parasitic plants	:	:	:	:	:	:	:	:	:	2. Cuscuta.

1. CONVOLVULUS

Trailing or twining; flowers peduncled, mostly solitary in the axils; corolla funnel-form to campanulate, plaited in the bud; stigmas 2; capsule globose, 2-seeded.

Calyx enclosed in 2 large bracts.										
Leaves reniform	:	:	:	:	:	:	:	:	:	1. C. Soldanella.
Leaves not reniform	:	:	:	:	:	:	:	:	:	2. C. sepium.
Calyx not enclosed, the 2 bracts small and remote	:	:	:	:	:	:	:	:	:	3. C. arvensis.

1. **C. Soldanella** L. Glabrous, somewhat fleshy; stems short, trailing; bracts not longer than the sepals; corolla pink-purple, 2-4 cm. long; stigmas ovate. Sandy shores. Savary Is.

2. **C. sepium** L. Glabrous, stem long, twining or trailing; leaves triangular-halberd-shaped, acute, long-petioled, the basal lobes obliquely truncate, entire or toothed, sometimes rounded; corolla 4-5 cm. long, white or pink, stigmas ovate. Across the continent. Var. **pubescens** (Gray) Fernald. More or less pubescent, leaves oblong-ovate, cordate, the basal lobes rounded. Victoria.

3. **C. arvensis** L. Trailing, rather slender; leaves oblong-ovate, 1-3 cm. wide, sagittate or halberd-shaped, the basal lobes acute, short-petioled; peduncles mostly 1-flowered; corolla 1.5-2 cm. long, white or pink; stigmas filiform. Introd., common. Var. **obtusifolius** Choisy. Basal lobes of leaves rounded.

2. CUSCUTA (DODDER)

Parasitic, twining by yellow, leafless, thread-like stems about various plants, adhering by suckers; flowers white in clusters, calyx and corolla 5-(or 4-) cleft; stamens with a fringed scale below their base; styles 2, distinct, capitate (in ours). (From the Arabic).

Capsule pointed	:	:	:	:	:	:	:	:	:	1. C. salina.
Capsule globose	:	:	:	:	:	:	:	:	:	2. C. arvensis.

1. **C. salina** Engelm. Stems low, slender, usually on *Salicornia*; flowers subsessile, calyx-lobes ovate, acute, a little longer than the corolla-tube; lobes of the corolla short-acuminate, erect; styles shorter than the ovary; corolla persistent about the 1-seeded capsule. Salt marshes, V. I., Fraser Delta; occasionally on Yarrow.

2. **C. arvensis** Beyrich. Stems pale-yellow, slender, rather low, flowers subsessile; calyx-lobes ovate, obtuse; corolla-lobes acute with reflexed tips; style mostly shorter than the depressed-globose ovary; corolla persistent about capsule. On Red Clover, Eburne; on Yarrow and Aster, Elgin.

POLEMONIACEÆ (PHLOX FAMILY)

Herbs, sometimes slightly woody at base; leaves opposite or alternate, entire or dissected; calyx inferior, tubular, 5-cleft; corolla 5-lobed; stamens 5, equally or unequally inserted on the tube alternate with its lobes; ovary superior, 5-celled; style simple, stigmas three; fruit a capsule.

Calyx-tube scarious below sinuses	1. Gilia.
Calyx-tube herbaceous.	
Leaves alternate, pinnate	2. Polemonium.
Leaves opposite, entire	3. Phlox.

1. GILIA

Herbs with mostly alternate entire or pinnatifid leaves; calyx 5-cleft, corolla tubular-funnelform or salver-form; stamens mostly unequally inserted on the corolla-tube; seeds developing mucilage and usually spiral threads when wetted. The species fall into 3 sections which are often considered distinct genera. (Gil was a Spanish botanist).

Sec. 1. Navarretia. Calyx-lobes rigid or spine-tipped, 2 of them longer than the rest; leaves pinnatifid; flowers in dense leafy-bracted cymes.

Plants glandular-viscid, stamens included	1. <i>G. squarrosa</i> .
Plants not glandular, stamens exerted	2. <i>G. intertexta</i> .

Sec. II. Collomia. Calyx not ruptured by the maturing capsule, its lobes not rigid; flowers in dense leafy-bracted cymes.

Leaves simple, lanceolate.	
Corolla-tube 2-3 cm. long, flowers salmon-colored	3. <i>G. grandiflora</i> .
Corolla 1 cm. long, pink	4. <i>G. linearis</i> .
Leaves more or less dissected, or, if lobed, ovate	5. <i>G. heterophylla</i> .

Sec. III. Gilia proper. Calyx distended or ruptured by the maturing capsule, its lobes not rigid, inflorescence dense or open.

Perennials, leaves dissected, corolla 3 cm. long, scarlet	6. <i>G. aggregata</i> .
Annuals.	
Some of the leaves opposite.	
Leaves dissected.	
Flowers clustered	8. <i>G. tenella</i> .
Flowers scattered	7. <i>G. pharnaceoides</i> .
Leaves simple	9. <i>G. gracilis</i> .
Leaves all alternate	
Leaves mainly in a basal rosette	10. <i>G. inconspicua</i> .
Leaves not in a basal rosette.	
Flowers capitate, blue, leaves lobed or dissected.	
Plants nearly glabrous	11. <i>G. capitata</i> .
Plants pubescent	12. <i>G. achilleæfolia</i> .
Flowers scattered, white, leaves entire or 3-parted	13. <i>G. minutiflora</i> .

1. *G. squarrosa* H. & A. Malodorous, 1-3 dm. high, generally branched, leaves bipinnatifid, the floral spinescent; corolla blue to whitish, 1 cm. long, little longer than the calyx; ovules 8-12 in each cell. Dry slopes, Victoria.

2. *G. intertexta* Steud. Simple or branched, 1-2 dm. high, leaves sparingly divided or simple, the lobes acrose and more or less spinescent; calyx and bracts villose; corolla white, equaling the calyx; ovules 3-4 in each cell. Heavy clay soil, Victoria.

3. *G. grandiflora* Gray. Simple or sparingly branched, 3-6 dm. high, annual; leaves lanceolate, entire, the floral bracts broader, more or less glandular, calyx-lobes short, acute. Open woods or among rocks, Coast to Rockies.

4. *G. linearis* Gray. More slender, puberulent, ill-smelling, 1.5-4 dm. high, annual; leaves lanceolate to linear, entire, the floral broader and viscid; corolla-tube yellowish, the limb pink or purplish, calyx-lobes acuminate. Dry open places, V. I. to Rockies and eastward.

5. *G. heterophylla* Hook. Pubescent, 1-3 dm. high, more or less glandular above; leaves pinnately dissected or sometimes merely lobed with some

even entire, ovate; the floral bracts entire, involucrate, ciliate; corolla pink to purple, yellowish at top of tube, 1-1.6 cm. long. Grassy slopes, V. I. Crescent; Yale.

6. *G. aggregata* Spreng. A very striking plant, 6 dm. high; leaves pinnately parted into linear segments, flowers in an elongate panicle, the small, short-peduncled clusters without leafy bracts; calyx-lobes linear, much longer than tube; seeds when wetted developing mucilage and spiracles. Plains and rocky banks. D. I.

7. *G. pharnaceoides* Benth. Slender, branches filiform, 1-2 dm. high; leaves palmately 2-5-parted into acerose segments; inflorescence a panicle, corolla-tube hardly longer than the calyx, calyx-lobes shorter than the tube; seeds developing mucilage but no spiracles. Plains, southern border, D. I.

8. *G. tenella* Benth. Low, 0.5-1 dm. high, usually simple, leaves palmately parted into 3-7 linear or spatulate segments, like the floral, more or less spinescent; corolla with a purple, filiform tube and a purplish or yellowish limb, the tube 10-15 mm. long, much longer than the calyx; seeds developing mucilage only. Dry hillsides, Victoria.

9. *G. gracilis* Hook. Usually glandular-pubescent, simple or widely branching, 1-3 dm. high; leaves alternate above; flowers in pairs, one of them nearly sessile; capsule cells 1-seeded, the seeds developing mucilage only; corolla 6-10 cm. long, with yellowish tube and pink or purple limb. (*G. humilis*) Grassy bluffs and plains, V. I. eastward.

10. *G. inconspicua* Dougl. Viscid-pubescent, 1-3 dm. high, branching from base; leaves pinnatifid, the upper small and entire; calyx with short teeth not half as long as the tube; corolla purplish, slightly longer than calyx; flowers crowded or at length loosely paniced, some of them with short pedicels. Dry hillsides, eastward.

11. *G. capitata* Dougl. Tall, 6-9 dm. high; leaves bipinnate with linear lobes; flowers in a dense head terminating peduncles 1-2 dm. long; calyx glabrous, the lanceolate lobes shorter than the tube; corolla-lobes narrowly oblong. Victoria; Port Haney; Kootenay. Probably introd.

12. *G. achilleæfolia* Benth. Similar; pubescent, 3-6 dm. high, the calyx very pubescent, its ovate lobes longer than the tube; corolla-lobes broadly oblong to obovate. Shawnigan, introd.

13. *G. minutiflora* Benth. Much branched, 2-5 dm. high, often glandular-puberulent above, the upper leaves small; the flowers spicately disposed along the branches, the corolla white, 4 mm. long, about twice as long as the calyx. Seeds not developing spiracles when wetted. D. I. Spence's Bridge, eastward.

2. POLEMONIUM (GREEK VALERIAN)

Herbs with alternate, pinnate leaves, and mostly showy flowers, corolla campanulate, funnel-form or rotate; stamens nearly equally inserted near the base of the corolla; ovules 1-several in each cell; seeds developing mucilage when wetted. (Greek *polemos*, war).

Annual; corolla white, 2-3 mm. long	1. <i>P. micranthum</i> .
Perennial; corolla mostly blue, 8-15 mm. long	2. <i>P. confertum</i> .
Leaflets apparently fasciated	
Leaflets not fasciated	3. <i>P. humile</i> .
Low, stems several, tufted	4. <i>P. coeruleum</i> .
Tall, stems, solitary	

1. *P. micranthum* Benth. Viscid-pubescent, diffusely branched at base, 1-2 dm. high; leaflets 5-13, 2-6 mm. long, corolla nearly rotate, 2-3 mm. long, calyx-lobes twice as long as the tube; filaments not dilated at base, glabrous or nearly so. Moist places, east of Cascades, Vernon; Victoria.

2. *P. confertum* Gray. Plants and flowers fragrant, 2-3 dm. high, tufted, leaflets 2-5 mm. long, 3-parted and thus appearing verticillate; corolla deep-blue, funnel-form, 15-20 mm. long, the stamens inserted near the middle of the tube; not dilated at base, glabrous or nearly so. Mt. summits, Mt Garibaldi and northward; Rockies.

3. *P. humile* R. & S. Loosely tufted, pubescent and usually glandular above, 1-3 dm. high; leaflets 15-25, 12 mm. long or less; flowers in cymose clusters, corolla campanulate, blue, with a yellow or white tube, hardly 2 cm. broad, filaments dilated at pubescent base; style hardly exerted; seeds 1-2 in each cell. Alaska southward. Penticton; Crow's Nest Pass.

4. *P. cœruleum* L. Glabrous or glandular, 3-6 dm. high, strict or sparingly branched, leaflets 15-21, 12-35 mm. long, often confluent; flowers paniced, corolla blue, 2.5 cm. broad, filaments dilated at pubescent base; style exerted, ovules 6-13 in each cell. Alaska to Wn.

3. PHLOX

Herbs, erect or matted, leaves mostly opposite at least below, entire; flowers large, in terminal cymes or axillary, calyx angled, corolla salverform with a long tube on which the stamens are unequally inserted; capsule ripening 1 seed in each cell.

Matted, leaves crowded; flowers solitary and sessile in the axils.

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|--|--------------------------|
| Leaves glandular | 1. <i>P. rigida</i> . |
| Leaves not glandular. | |
| Leaves needle-shaped, style half as long as the corolla-tube | 2. <i>P. Douglasii</i> . |
| Leaves not all needle-shaped, some broader; style nearly as long as the corolla-tube | 3. <i>P. diffusa</i> . |

Not matted, leaves not crowded, flowers peduncled, more or less cymose.

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|---|---------------------------|
| Style nearly equalling the corolla tube | 4. <i>P. longifolia</i> . |
| Style much shorter | 5. <i>P. speciosa</i> . |

1. *P. rigida* Benth. Low, stem short-pubescent and glandular; leaves crowded, 6-10 mm. long, acerose, rigid, spiny-tipped, ciliate, glandular; calyx-teeth somewhat spreading, spiny-tipped, the tube carinate; corolla pink or heliotrope, the tube a little more than twice as long as the pubescent calyx. Gateway; Eastern Wn.

2. *P. Douglasii* Hook. Low, leaves acerose to linear-subulate, not at all glandular, often ciliate near the base, pubescent to glabrous, 6-10 mm. long, pungently pointed; calyx pubescent, its lobes as long as the tube. Rockies southward; Wigwam River, Kootenay.

3. *P. diffusa* Benth. Low; leaves acerose, some of them slightly broader, more or less woolly on the margins towards the base, otherwise glabrous, 8-15 mm. long, pungently pointed, calyx usually woolly, sometimes nearly glabrous, the lobes about as long as the tube; style $\frac{3}{4}$ - $\frac{1}{2}$ as long as the tube; corolla pink or lavender. Mts., coast to Rockies. (*P. Douglasii* var. *diffusa*).

4. *P. longifolia* Nutt. Erect, 2-4 dm. high, or sometimes low and prostrate; glabrous except for slight pubescence at the basal margins of the leaves; leaves linear, 2-5 cm. long, pungent; calyx saliently angled by the projection of the scarious sinuses, glabrous, the lobes shorter than the tube; corolla pink or lavender, nearly twice as long as the calyx. Dry plains, Summerland.

5. *P. speciosa* Pursh. Tall, somewhat viscid-glandular above; leaves linear, 2-8 cm. long; tube of corolla little longer than the calyx, which is not saliently angled. Perhaps on the southern border adjoining Eastern Wn.

HYDROPHYLLACEÆ (WATER-LEAF FAMILY)

Herbs, hairy or silky, with mostly alternate leaves and false racemes (scorpioid cymes) of white or blue flowers; stamens 5, often bearded at the middle; style mostly 2-cleft, ovary entire, 1 celled, or sometimes 2-celled by the intrusion of the 2 placentæ; fruit a 2-valved, few- to many-seeded capsule.

Style entire, leaves orbicular	1. Romanzoffia.
Style 2-cleft.	
Stamens included, calyx with small appendages between the sepals	2. Nemophila.
Stamens mostly exserted, calyx without appendages.	
Placentæ wide, corolla lobes convolute in the bud	3. Hydrophyllum.
Placentæ narrow, in fruit projecting inwards, corolla lobes imbricated in the bud	4. Phacelia.

1. ROMANZOFFIA

Perennial, leaves chiefly radical, round, with long petioles, stem scapose; corolla campanulate, white; flowers loosely racemose, 1 cm. broad; stamens unequal; ovary 2-celled or nearly so; seeds many. (Romanzoff was a Russian who sent Kotzebue to Alaska).

1. *R. sitchensis* Bong. Stems slightly pubescent, 1-2.5 dm high; leaves cordate, the blade 1.5-3.5 cm. broad, coarsely and very regularly crenate-lobed; pod obovoid, retuse, larger than the glabrous calyx. Cliffs, Coast and Cascade Mts.; also in the Rockies; Alaska.

2. *R. unalaschensis* Cham. Stems pubescent, from thick, somewhat tuberous roots, less than 1 dm. high; leaves round-cordate, less than 1 cm. broad, with a few, usually irregular, crenations, or almost entire; calyx very pubescent; pod ovoid, 2-celled, pubescent. Uclulet, V. I. Alaska.

2. NEMOPHILA (GROVE-LOVER)

Annual herbs with opposite or alternate, usually pinnatifid leaves; flowers solitary on long peduncles; the sinuses of the calyx with a small appendage; 10 more or less evident appendages on the tube of the corolla, 2 opposite each lobe; stamens included. (*Nemos*, a grove, and *phileo*, I love).

Corolla 2-3 cm. broad, rotate	1. <i>N. Menzeisii</i> .
Corolla small, campanulate.	
Leaves mostly alternate, calyx appendages half as long as the lobes	2. <i>N. breviflora</i> .
Leaves mostly opposite, calyx appendages very small.	
Ripe seeds with no caruncle, pubescence not pustulate.	
Peduncle shorter than or a little exceeding the leaves.	3. <i>N. parviflora</i> .
Peduncle much exceeding the leaves	4. <i>N. pedunculata</i> .
Ripe seeds with a large caruncle, pubescence more or less pustulate	5. <i>N. micrantha</i> .

1. *N. Menziesii* H. & A. Sparingly strigose-pubescent, 0.5-2 dm. high, branching from the base, the branches mostly prostrate; leaves long-peduncled with rounded lobes; corolla rotate, white or blue with dark blue spots. Dry hillsides, Victoria.

2. *N. breviflora* Gray. Erect 1-2 dm. high, weak, branching from the base; leaf-lobes 5, acute; peduncles seldom exceeding the petioles, corolla whitish or bluish, shorter than the calyx, appendages in the throat cuneate; style minutely 2-cleft; seeds nearly smooth; caruncle evanescent. Rossland.

3. *N. parviflora* Dougl. Stem sparingly retrorsely hispid, weak but usually erect; leaves hispid especially beneath, 1-1.5 cm. broad, oblong, the usually 5 lobes acute or obtuse, often mucronate, the petiole hardly as long as the blade; corolla bluish, one-half longer than the calyx, its appendages linear or obsolete; the style cleft nearly to the middle; seeds about 4, 1.5 mm. thick, light-yellow, obscurely corrugated. Common in partial shade, V. I., and coast.

4. *N. pedunculata* Dougl. Low, a few cm. high; the stem slightly hispid; leaves less than 1 cm. broad, the blade usually shorter than the somewhat blade-like petiole; style cleft one-quarter of its length; limb of the corolla bluish, its lighter-colored base black-dotted, the appendages broad, glabrous; seeds usually 5, very light-yellow, minutely pitted. Grassy roadside, Duncan; Cal.

5. *N. micrantha* Eastw. Stems prostrate, 3-6 dm. long; retrorsely hispid; the upper leaves alternate ovate-orbicular, somewhat palmately lobed, the lower opposite, mostly pinnately 5-lobed, the petioles usually shorter than the blades; some of the peduncles much shorter than the leaves; the style divided nearly to the middle; appendages of calyx $\frac{1}{4}$ - $\frac{1}{3}$ as long as the lobes; corolla bluish or whitish, its appendages narrow, ciliate; seeds orange-yellow, pitted and corrugated, 2.5 mm. thick. (*N. pustulata* Eastw.) Victoria, Cameron Lake.

3. HYDROPHYLLUM (WATER-LEAF)

Perennials from thick roots; leaves broad, petioled, pinnately lobed or divided; flowers white or bluish, cymose; calyx 5-parted, without appendages, not enlarging in fruit; corolla campanulate, pubescent without, each lobe with an oblong inner appendage; filaments long-exserted, bearded in the middle; placentæ broad, pod globose, 4-ovuled. (Greek *hydor*, water, *phyllon*, a leaf).

Flowers in dense clusters; peduncles shorter than the subtending petioles; anthers short

Flowers in loose clusters; peduncles longer than the subtending petioles; anthers linear-oblong.

Calyx-lobes pubescent on the back.

Plants 2-3 dm. high; leaf-segments 3-5 cm. long

Plants 4-6 dm. high; leaf-segments 5-9 cm. long, white beneath.

Calyx-lobes glabrous on the back, hispid-ciliate on the margins

1. *H. capitatum*.

2. *H. Fendleri*.

3. *H. albifrons*.

4. *H. tenuipes*.

1. *H. capitatum* Dougl. Stems 1-2.5 dm. high, ascending, retrorsely short-hispid; leaves firm, oblong to ovate, 4-6 cm. broad, appressed pilose-pubescent below, the 5-7 lobes entire or sparingly lobed, mucronate, acute or obtuse; corolla blue, cleft to the middle, $\frac{1}{3}$ longer than the white-hispid-pubescent sepals. Rich, moist soil, Kootenay; Mt. Fernie.

2. *H. Fendleri* (Gray) Heller. Usually hirsute-pubescent, leaf-divisions ovate-lanceolate, acute, incisely serrate; cyme rather open, corolla white or nearly so; peduncle shorter than the leaves. Mts., Spence's Bridge to Cal. Mt. Cheam specimens have soft pubescence and leaves tomentose beneath.

3. *H. albifrons* Heller. Stems erect, 4-6 dm. high, pubescent, more hispid below; leaves thin, oblong-ovate, 1 dm. broad or more, white beneath, sparsely pubescent, the 5 or more segments rather distant, coarsely serrate, or the lower 2-lobed; pedicels 2-3 cm. long, the peduncle 3 cm. or more in length; calyx $\frac{1}{2}$ as long as the creamy or faintly purple corolla; corolla-lobes oblong, obtuse or notched. Mt. Cheam and eastward.

4. *H. tenuipes* Heller. About 5 dm. high, the stem sparingly hispid with clear hairs; leaves ovate, somewhat white beneath, sparingly appressed-hispid, with short, clear hairs; the usually 3 divisions approximate, coarsely toothed or lobed, the lower 2-lobed, the lobes acute, mucronate; peduncles usually 1 dm. long or more; corolla creamy or purplish, a little longer than the calyx, the long lobes oval, notched or entire. Goldstream.

4. PHACELIA

Annual or perennial, with alternate simple or pinnatifid leaves, and campanulate blue or white flowers; calyx hardly enlarging in fruit; stamens more or less bearded, unequally inserted; the placentæ sometimes joining

to produce a more or less perfectly 2-celled ovary; inflorescence showy, of several scorpioid cymes. (Greek *phakelos*, a fascicle, from the clustered flowers).

Leaves simple or with a few lobes at the base of the blade.

Flowers 12 mm. or more in breadth, filaments about equaling the corolla	1. <i>P. Menziesii</i> .
Flowers less than 10 mm. broad, filaments much longer than the corolla.	
Plants green.	
Corolla blue	2. <i>P. heterophylla</i> .
Corolla white	3. <i>P. leptosepala</i> .
Plants hoary	4. <i>P. leucophylla</i> .
Leaves pinnate or pinnatifid, stamens exserted	5. <i>P. sericea</i> .

1. *P. Menziesii* Torr. Hispid annual, 1-4 dm. high, simple or branching; leaves narrowly lanceolate, sessile, entire, or some of them with 2-3 long, narrow lobes; corolla bluish, with appendages in pairs opposite the lobes; stamens hardly exserted; ovules many. Common, D. I.

2. *P. heterophylla* Pursh. Hispid, stout, 3-6 dm. high; leaves lanceolate, simple, or usually some with a pair of small spreading segments at the base of the blade, the lower long-petioled; inflorescence branching, dense; stamens exserted, sparingly or not at all bearded; calyx-lobes lanceolate, beset with reddish hairs; corolla slightly pubescent, 5 mm. long; ovules few. Mt. Cheam; Cottonwood Creek; Cowichan Lake.

3. *P. leptosepala* Rydb. Stems ascending, hirsute, 1-3 dm. high; leaves usually simple, the lower petioled, oblanceolate or elliptical; inflorescence with several short branches; calyx hirsute, the lobes narrowly linear, acute, nearly as long as the corolla; corolla white, glabrous or nearly so, 5 mm. long, filaments about twice as long, sparingly bearded; ovules few. Vermilion Lake; Lardo.

4. *P. leucophylla* Torr. Densely and finely velvety-pubescent, 3-4 dm. high, leaves narrowly lanceolate, the lower long-petioled, the veining very distinct; branches of the inflorescence short and stiff; corolla white or bluish, hardly 5 mm. long; calyx-lobes obtuse, oblong-lanceolate, puberulent with bristly-hirsute margins; stamens usually bearded at the middle; ovules 2 on each placenta. D. I.; Grand Forks; Princeton.

5. *P. sericea* Gray. Silky-canescens, 1-4 dm. high, perennial, the lower leaves petioled, somewhat doubly-pinnatifid; inflorescence dense; corolla white, blue or purple; stamens long-exserted, glabrous; calyx-lobes linear; ovules many. Mts. V. I. to Rockies. Var. *Lyallii* Gray. Greener leaves, simply pinnatifid. Rockies and Selkirks.

BORAGINACEÆ (BORAGE FAMILY)

Herbs, mostly hirsute, with alternate entire exstipulate leaves and perfect, mostly regular, flowers, in scorpioid cymes or racemes, which often unroll like a developing fern frond; corolla often crested in the throat; stamens 5 in its tube, style simple or 2-cleft; fruit 4 one-seeded nutlets, attached to an elevation or the receptacle called the gynobase.

Nutlets with barbed or hooked prickles.

Prickles barbed, nutlets thick, flowers blue.	
Nutlets covered with prickles	1. <i>Cynoglossum</i>
Nutlets prickly only on the margin	2. <i>Lappula</i> .
Prickles hooked at top, nutlets thin, flowers white	3. <i>Pectocarya</i> .
Nutlets not prickly, though sometimes muriculate.	
Nutlets attached by the very base.	
Raceme leafy, nutlets white, shining	4. <i>Lithospermum</i> .
Raceme bractless.	
Coarse stout plants, corolla purplish	5. <i>Symphytum</i> .
Slender plants, corolla blue, white or yellow	6. <i>Myosotis</i> .

Nutlets attached above the base.

Corolla yellow.

Throat of corolla naked or hairy 7. *Amsinckia*.

Throat of corolla with folds on the throat 12. *Oreocarya*.

Corolla blue.

Calyx with 5 flat lobes and 5 smaller alternating ones; flowers small 8. *Asperugo*.

Calyx 5-lobed, flowers rather large 9. *Mertensia*.

Corolla white or whitish.

Nutlets more or less keeled on the outer face, the scar ovate or orbicular.

Nutlets broadest at the middle and attached at the middle. 10. *Plagiobothrys*.

Nutlets ovoid, attached just above the base 11. *Allocarya*.

Nutlets not keeled on the outer face, the scar linear or dilated at the base.

Nutlets attached for more than half their length; calyx persistent 12. *Oreocarya*.

Nutlets attached for $\frac{1}{2}$ - $\frac{1}{2}$ of their length.

Calyx circumscissile, the upper part deciduous, throat of corolla open 13. *Piptocalyx*.

Calyx not circumscissile, deciduous with fruit; throat of corolla closed 14. *Cryptanthus*.

1. CYNOGLOSSUM (HOUND'S TONGUE)

Tall, pubescent herbs with long-petioled, large, basal leaves; corolla funnel-form or salver-form with crests in the throat; stamens and style included; calyx 5-parted, open in fruit; nutlets flat or convex, wingless, attached near the top to the low gynobase. (Greek *kuon*, a dog, and *glossa*, a tongue, in allusion to the shape and texture of the leaves).

1. *C. boreale* Fer. Stems 5 dm. high, spreading, villous-hispid below, appressed-pubescent above; lower leaves oblong-oval, hispid, the upper clasping; calyx 2.5 mm. long, its lobes ovate; corolla 5 mm. broad, nutlets obovoid, 4-5 mm. long. Open woods, Donald; Armstrong.

2. *C. grande* Dougl. Soft-villous, becoming glabrate, 3-9 dm. high; lower leaves ovate or sub-cordate, acute, the upper wing-petioled; calyx-segments ovate; style slender, thickened towards the base; nutlets ovoid, 7-8 mm. long. Open woods near the southern boundary, Kootenay.

2. LAPPULA (STICK-SEED)

Mostly rough-hairy herbs with small blue flowers in elongated racemes, corolla salver-form, the throat closed by scales, stamens included; nutlets attached laterally, erect, prickles distinct or uniting at base. (*Echinospermum*) (Latin *lappa*, a bur).

Flowers greenish-white 1. *L. hispida*.

Flowers blue or purplish.

Raceme bractless above, fruiting pedicels reflexed.

Corolla 4-6 mm. broad, pedicels short 2. *L. floribunda*.

Corolla 8-10 mm. broad, pedicels long 3. *L. diffusa*.

Raceme bracteate throughout, fruiting pedicels erect or spreading

Lateral prickles of nutlets distinct.

Prickles in a double row 4. *L. echinata*.

Prickles in a single row 5. *L. occidentalis*.

Lateral prickles of nutlets united 6. *L. cupulata*.

1. *L. hispida* (Gray) Greene. Hispid perennial, 3-9 dm. high; leaves lanceolate, often 1 dm. long, the lowest long-petioled, the upper sessile; corolla 5-6 mm. broad; nutlets more or less prickly all over the back, the marginal prickles united for half their length into a wing, scar triangular or ovate. Spence's Bridge.

2. *L. floribunda* (Lehm.) Greene. (FALSE FORGET-ME-NOT). Soft-pubescent or pilose on the stem, 3-9 dm. high; perennial; lower leaves oblong-lanceolate, long-petioled, 1-2 dm. long, the upper sessile; pedicels shorter than the fruit; corolla blue or purplish; nutlets scabrous on the back, with a single row of flat marginal prickles; scar ovate. Yale; Rockies.

3. *L. diffusa* (Lehm.) Greene. Soft-hirsute perennial, 3-6 dm. high; leaves lanceolate or narrower, the lower tapering to a marginal petiole, the upper reduced to bracts in the paniced racemes; pedicels much longer than the fruit; corolla blue to pink; nutlet scabrous on the back with a single row of flat prickles. Nelson; Rockies.

4. *L. echinata* Gil. (EUROPEAN S.) Hispid annual, 1.5-6 dm. high branching above; leaves spatulate below, linear above; pedicels very short, not deflexed; nutlets tuberculate on the back, the prickles in 2 rows or distributed. (*L. Lappula* Lehm.) Introd weed.

5. *L. occidentalis* (Wats.) Rydb. Stems branching, 1-4 dm. high, pubescent, leaves linear or narrowly oblong-lanceolate, the pubescence usually pustulate at base; racemes loosely flowered; flowers very small; pedicels short, stout, not deflexed in fruit, 1-2 mm. long; nutlets tuberculate with a single row of prickles. Common, dry plains east of Cascades; Alaska to Minn.

6. *L. cupulata* (Gray). Rydb. Similar; the marginal prickles broad at base, uniting by the base on at least 3 of the nutlets to form a cup. (*L. texana*). Same range.

3. PECTOCARYA

Small annuals with small flowers scattered along the whole length of the stem; calyx spreading or reflexed in fruit; the throat of the white corolla closed by the appendages; stamens and capitate stigma included; nutlets winged, more or less prickly.

1. *P. penicillata* A. DC. Diffuse, 0.5-1.5 dm. high, pubescent; leaves linear; nutlets with incurving wing, bristly at the apex. Dry plains, Lytton.

4. LITHOSPERMUM (GROMWELL)

Rough herbs with sessile leaves; corolla yellow, salver-form; calyx parted to the base; anthers nearly sessile; nutlets white and shining, rough in 1 species. (Greek, *lithos*, a stone, *sperma*, a seed, descriptive of the nutlets).

Nutlets rough and dull 1. *L. arvense*.

Nutlets smooth and shining.

Corolla-tube 3 times as long as the calyx 2. *L. angustifolium*.

Corolla-tube not much exceeding the calyx 3. *L. pilosum*.

1. *L. arvense* L. Minutely roughened and hoary, erect; leaves lanceolate or linear; corolla nearly white, scarcely longer than the calyx. Introd.; fields, Armstrong.

2. *L. angustifolium* Michx. Erect or diffusely branched from the base, the pubescence of the stem appressed; leaves linear; flowers of two kinds—the earlier large, the tube 1.8-2 cm. long, the rounded lobes erose; the later inconspicuous; nutlets usually punctate on inner side, 3.5 mm. long. Plains and hillsides, D. I.; Telegraph Trail.

3. *L. pilosum* Nutt. (PUCCOON). Hirsute; stems many, leafy, mostly simple, or sparingly branching above; leaves linear-lanceolate; corolla greenish-yellow, pubescent outside, 8-12 mm. long; nutlets white and shining. Dry plains and hillsides in the interior.

5. SYMPHYTUM (COMFREY)

Coarse perennials with thick roots and nodding, false racemes; corolla with 5 short, spreading teeth, the throat closed with scales, stamens included, style filiform, nutlets shining but roughish. (Greek *symphuein*, to grow together, probably in allusion to healing virtues).

1. *S. asperrium* Don. Hirsute, with harsh, recurved hairs; leaves large, not decurrent; corolla purplish. Naturalized at Spence's Bridge.

6. MYOSOTIS (FORGET-ME-NOT)

Low, soft-hirsute or pubescent herbs, the corolla-tube about the length of the 5-lobed or 5-cleft calyx with blunt appendages in the throat; stamens included; flowers in bractless racemes; nutlets shining, smooth. (Greek *mus*, a mouse, *ous*, an ear, descriptive of the short leaves of some species).

Calyx-lobes erect or closing in fruit, some of its hairs hooked.

Pedicels shorter than the calyx.

Calyx equally 5-cleft

Alpine, corolla 6 mm. broad

Not alpine, corolla 2-3 mm. broad

Calyx unequally and deeply 5-cleft, corolla white

Pedicels in fruit longer than the calyx.

Calyx-lobes somewhat spreading in fruit, its hairs appressed, not hooked

1. *M. alpestris*.

2. *M. versicolor*.

3. *M. macrosperma*.

4. *M. arvensis*.

5. *M. laxa*.

1. *M. alpestris* Schmidt. (ALPINE F.) Tufted, erect; leaves oblong-linear, the radical conspicuously petioled; flowers blue with yellow eye, in rather dense racemes. Alpine meadows, Rockies; Alaska.

2. *M. versicolor* Sm. Slender, 0.5-2.5 dm. high, simple or branching, hirsute-pubescent, with ascending hairs, the pedicels appressed-pubescent; leaves oblong or the lower spatulate, narrowed below into short margined petioles; corolla pale-yellow, changing to blue or purple. Introd. Low, but not wet, ground, Victoria; New Westminster.

3. *M. macrosperma* Engelm. (WHITE F.) Hirsute, 1 dm. or less high, simple or branching from base; leaves spatulate, oblong or oblanceolate, calyx-lobes unequal, longer than the tube; corolla white, 2-3 mm. broad. Gravelly hillsides, V. I. and D. I.; Castlegar.

4. *M. arvensis* Hill. (FIELD F.) Hirsute, with spreading hairs; leaves oblong-lanceolate to oblanceolate, the lower usually petioled; racemes naked at base; corolla blue, (rarely white) 2-3 mm. broad. Wet ground, New Westminster, Nanaimo.

5. *M. laxa* Lehm. (WATER F.) Decumbent, rooting at the lower nodes, often 4-5 dm. long; leaves oblong to lanceolate or spatulate; pubescence appressed; calyx-lobes equaling or longer than the tube; corolla 4 mm. broad, limb concave, blue with yellow eye. Brooks and wet places, widely diffused. Arrowhead; common at the Coast.

7. AMSINCKIA

Coarse, hirsute annuals with yellow, salver-form or tubular-funnel-form corollas; style filiform; nutlets rough, ovoid-trigonus, attached below the middle; the scorpioid-spicate inflorescence leafy-bracted, at least below; calyx elongating in fruit, bristly white-hairy. (Amsinck was a burgomaster of Hamburg).

1. *A. intermedia* F. & M. Erect, sparingly branched, leaves linear to narrowly lanceolate, flowers mostly bractless, calyx-lobes linear-lanceolate; corolla little exceeding the calyx; nutlets strongly muriculate with transverse rugosities. Dry soil, throughout.

2. *A. lycopoides* Lehm. Decumbent, loosely branched, leaves ovate to lanceolate; corolla 1 cm. long, the tube exceeding the calyx; calyx-lobes lanceolate-ovate, 2 or 3 of them often united, flowers mostly bractless; nutlets oblong-ovate, muriculate with transverse rugosities. Mary Is.; D. I. Var. *bracteosa* Gray. Flowers smaller with bracts. Coast, common.

3. *A. barbata* Greene. Erect or decumbent; all except the upper flowers subtended by an ovate-lanceolate clasping bract, corolla small, sepals nearly linear, nutlets ovate-acuminate without transverse rugosities. Cameron Lake, V. I.

8. ASPERUGA (MADWORT)

Procumbent, rough-hispid annuals; corolla with short tube and narrow limb, shorter than the conspicuous calyx; nutlets granulated, attached by the middle. (Latin, *asper*, rough).

1. *A. procumbens* L. Low; leaves oblong or spatulate; the few, axillary, blue flowers on short, recurved pedicels. Introd., Vernon.

9. MERTENSIA (LUNGWORT)

Glabrate or pubescent herbs with rather large, blue flowers in a terminal cymose raceme; corolla tubular-funnel-form or trumpet-shaped, crested or unappendaged in the throat; stamens included; filaments short, flattened; nutlets wrinkled. (Mertens was a German botanist).

Tall plants, 3-9 dm. high.

Calyx nearly half as long as the corolla.

Leaves pilose beneath

Leaves glabrous beneath

Calyx $\frac{1}{2}$ - $\frac{1}{3}$ as long as the corolla

Low plants, 1 dm. or so high.

Corolla-tube 3-4 times as long as the limb

Corolla-tube 1-2 times as long as the limb

1. *M. paniculata*.

2. *M. laevigata*.

3. *M. ciliata*.

4. *M. oblongifolia*.

5. *M. Horneri*.

1. *M. paniculata* Don. Leaves many, broadly lanceolate, pilose beneath, strigose above, corolla about 14 mm. long, the calyx hardly half as long, the lobes elongate, acute; filaments slightly longer than the anthers. Open woods, Alaska southward in eastern B. C.

2. *M. laevigata* Piper. Similar; leaves lance-ovate, acuminate, glabrous beneath, papillose-scarious above, scarious-ciliate. Nelson.

3. *M. ciliata* Don. Glaucous, nearly glabrous from a thick root; leaves many, ciliate-margined, otherwise glabrous, the cauline oblong to ovate-lanceolate, the upper acuminate, the lower ovate or sub-cordate; corolla 12-20 mm. long, the calyx about $\frac{1}{4}$ as long, its lobes obtuse, short, ciliate; filaments not longer than the anthers. (*M. sibirica*.) Alaska southward, Rockies.

4. *M. oblongifolia* Don. Root corm-like, leaves oblong to spatulate-lanceolate, smooth, or minutely scarious above; flowers in a rather close panicle; calyx-lobes little more than 2 mm. long, ciliate, the corolla 12 mm. long, blue with a purplish tube; filaments as broad as, and not longer than, the anthers. Moist ground, Columbia Valley.

5. *M. Horneri* Piper. From a shallow, black tuber; leaves oblong, appressed-puberulent above; inflorescence close; calyx parted nearly to the base, ciliate; corolla 10-12 mm. long; filaments dilated, as long as the anthers. Rossland (Botanical Office).

10. PLAGIOBOTHRYS

Annual, leaves mostly in a basal tuft, stems with soft spreading pubescence; flowers small, the throat conspicuously crested; nutlets rugose, keeled on both sides near the apex, attached about the middle to a conical projection; scar round. (Greek, *plagies*, oblique, *bothros*, a scar).

1. *P. echinatus* Greene. Stems 1-2 dm. high, with few leaves, usually forking at the inflorescence, a flower in the forks; leaves hispid-pubescent; inflorescence dense, calyx cleft to the middle, the lobes ovate; nutlets broadest at the middle, somewhat cross-shaped, white with black spots, shining, faintly transversely rugose, with lines of pointed tubercles. Plains, southern interior.

2. *P. tenellus* Gray. Pubescent with rather soft hairs; stem 1-2 dm. high, usually branching from the base, basal leaves numerous in a dense rosulate tuft, the cauline few; racemes geminate without a flower in the fork, calyx cleft to below the middle, persistent, 4 mm. long, fulvous-hirsute, the lobes acuminate-triangular; corolla 2 mm. broad, nutlets somewhat cross-shaped, shining, sharply carinate on the back, transversely rugose and sharply tuberculate. Plains, southern interior.

11. ALLOCARYA

Low, hispid annuals, the lowest leaves opposite; calyx parted to the base, the segments somewhat enlarging and open in fruit; corolla salver-form with a short tube, white limb and yellow throat; pedicels usually thickened under the calyx; nutlets rugose. (Greek *allos*, another, *karyon*, a nut).

Corolla 2-3 mm. broad	
Inflorescence bracted throughout	2. <i>A. plebia</i> .
Inflorescence bractless above	1. <i>A. californica</i> .
Corolla 5-8 mm. broad	
Pedicels 7-15 mm. long.	3. <i>A. chorisiana</i> .
Pedicels 2-3 mm. long	4. <i>A. Scouleri</i> .

1. *A. californica* (DC.) Greene. Branching from the base, the branches often prostrate, 1-3 dm. long; appressed hispid-pubescent; leaves linear-oblong, the largest 3-4 cm. long, pedicels very short, about 1 mm. long, calyx-segments not enlarging in fruit, very hispid; the crests of the small corolla not closing the throat; nutlets 1.7 mm. long, carinate ventrally and often slightly so at the apex dorsally, rugose, more or less tuberculate and minutely granulate, scar small, ovate-triangular. Wet places that dry in summer. Common, V. I.; Nanaimo; Victoria.

2. *A. plebia* (Gray) Greene. Branches spreading; stems sparsely and softly appressed-pubescent; pedicels very short; leaves narrowly oblong; segments of the calyx slightly enlarging in fruit, slightly hispid; nutlets 1.5-2 mm. long, coarsely rugose, reticulated, not at all muriculate, carinate ventrally, and dorsally at the apex; scar large, ovate. Alaska to Wn. in the Coast region. Victoria.

3. *A. chorisiana* (DC.) Greene. Stem 3-6 dm. high, branching; larger leaves 5-8 cm. long, racemes more or less leafy-bracted; pedicels not enlarged below the slightly accrescent calyx, nutlets little more than 1 mm. long, carinate ventrally only, rugose and minutely granulate on the back. Vicinity of Victoria.

4. *A. Scouleri* (DC.) Greene. Stem 1-3 dm. high, branching from the base, the branches ascending; the largest leaves 3-4 cm. long; flowers bractless, very fragrant; pedicels very short, calyx not enlarged in fruit, the crests of the prominent, puberulent; nutlets 1-7 mm. long, carinate ventrally and at the apex dorsally, rugose and granulate; scar ovate. Wet, open glades, Nanaimo; Victoria.

12. OREOCARYA

Coarse, hispid perennials or biennials; calyx 5-parted, the segments linear, erect in fruit, corolla with prominent folds in the throat, and an inconspicuous ring, or more or less conspicuous scales, at the base; nutlets not keeled on the back, attached for most of their length to a subulate gynobase, the scar long, linear, a little dilated at base. (Greek *oros*, a mountain, and *karyon*, a nut).

1. *O. glomerata* (Pursh.) Greene. Grayish-hirsute, 1-5 dm. high; leaves linear-spatulate; flowers in axillary racemes, corolla white, its tube not longer than the calyx, with 10 small scales or glands within near the base; style rather short; nutlets tuberculate-rugose on the back. Alberta to Wn.; S. E. Kootenay.

2. *O. leucophæa* (Dougl.) Greene. Grayish-hirsute, 2-4 dm. high; leaves lanceolate-oblong to linear; inflorescence usually forking with a flower in the fork; calyx clothed with stiff white or yellowish hairs; corolla yellow or white, its tube exceeding the calyx; nutlets smooth and shining. Lytton, and D.I.

13. PIPTOCALYX

Low, dichotomously branching annuals, the small flowers sessile in the forks or in the axils of the leaves or bracts; calyx circumscissile, the 5-cleft upper portion falling, leaving the persistent base; pedicels short, persistent; corolla with naked, open throat, about 2 mm. wide; nutlets margined, attached by their whole length. (Greek *pipto*, I fall, in allusion to the deciduous calyx).

1. *P. circumscissus* (Gray) Torr. Hispid-canescens, 0.5-1 dm. high, the linear leaves crowded on the lower part of the branches; nutlets not keeled, smooth or minutely tuberculate, the ventral groove forked at the base. Spence's Bridge.

14. CRYPTANTHE

Low hispid annuals with sessile or short-pedicelled flowers in racemes or spikes; calyx 5-cleft, corolla white with 5 crests closing the throat; nutlets smooth in the following species, attached for half their length; scar in ours hardly widened or forked at the base; pedicels deciduous. (Greek *kryptos*, hidden, and *anthos*, a flower).

1. *C. flaccida* (Gray.) Greene. Slender, 1-3 dm. high, the pubescence appressed; leaves spatulate to linear; racemes usually in pairs; sepals filiform; mature nutlets 1 or 2, acuminate, attached for one-third of their length, the groove enlarged at base, but not forked. Plains, southern border, D. I.

2. *C. affinis* Gray. Hirsute, diffusely branched, 1-3 dm. high; leaves spatulate; spikes solitary or in pairs; sepals linear-lanceolate, bristly; nutlets attached up to the middle; mature nutlets 4, acute, the ventral groove simple to the base. Near the 49th parallel east of the Cascades.

VERBENACEÆ (VERBENA FAMILY)

Herbs with opposite leaves and flowers in terminal spikes; calyx 4-5-cleft; corolla gamopetalous, more or less 2-lipped or irregular; stamens 4 didynamous; the 2-4-celled fruit usually splitting when ripe into 2-4 1-seeded nutlets; the superior ovary not 4-lobed.

VERBENA (VERVAIN)

Corolla salver-form, somewhat unequally 5-lobed, calyx tubular, 5-toothed; stamens included, style slender, stigma 2-lobed; flowers sessile in axils of bracts; fruit splitting into 4 nutlets.

1. *V. hastata* L. Rough-pubescent perennials, 5-20 dm. high, leaves oblong-lanceolate, cut-serrate, or the lower lobed and somewhat hastate, petioled; spikes numerous, linear (the ovate bracts shorter than the calyx); corolla blue, 3 mm. broad. Alluvial soil, Spallmacheen.

2. *V. bracteosa* Michx. Hirsute, with stiff spreading hairs, 1-4 dm. high; leaves pinnatifid, cuneate at base, short-petioled; spikes few, thick, the flowers in the axils of long, leafy bracts; corolla purplish-blue, small. Dry plains, Penticton; Kamloops.

LABIATÆ (MINT FAMILY)

Herbs with square stems and opposite, usually aromatic, exstipulate leaves; flowers chiefly in cymose axillary clusters; corolla mostly 2-lipped; stamens didynamous or only 2; ovary 4-parted, superior, style 2-lobed; fruit 4 one-seeded nutlets, at the base of the persistent calyx.

- Plants creeping or trailing.
 Flowers several in the axils 4. Nepeta.
 Flowers solitary in the axils 5. Micromeria.
- Plants erect.
 Ovary merely lobed, scar on nutlets lateral 1. Teucrium.
 Ovary deeply 4-parted, scar on nutlets basal.
 Calyx with a helmet-like projection 2. Scutellaria.
 Calyx without a projection.
 Corolla regular or nearly so, 4-5-toothed.
 Anther-bearing stamens 2. 15. Lycopus.
 Anther-bearing stamens 4 16. Mentha.
 Corolla distinctly 2-lipped.
 Stamens included in the corolla-tube; calyx with 10 spiny, recurved teeth 3. Marrubium.
 Stamens exerted beyond the corolla-tubes; calyx 15-veined in Nos. 4, 6, 7 and 14, 5-13-veined in the rest.
 Upper lip of corolla concave, (the concave curvature inwards).
 Anther-bearing stamens 4.
 Upper pair of stamens longer than the lower.
 Upper leaves and bracts spiny-toothed, leaves oblong 6. Dracocephalum.
 Upper leaves and bracts not spiny-toothed, leaves triangular ovate to round-cordate.
 Corolla not much longer than the calyx, clusters sessile 7. Agastache.
 Corolla 2-3 times as long as the calyx, clusters peduncled 4. Nepeta.
 Upper pair of stamens shorter than the lower.
 Leaves mostly 3-cleft 8. Leonurus.
 Leaves entire, serrate or crenate.
 Calyx closed in fruit, 2-lipped, inflorescence densely spicate 9. Prunella.
 Calyx open in fruit, not 2-lipped, inflorescence loosely spicate or axillary.
 Leaves lanceolate, or ovate.
 Plants pubescent or hirsute, leaves mostly rounded or cordate at base.
 Calyx-teeth spinulose, equaling the tube. 10. Galeopsis.
 Calyx-teeth not spinulose, shorter than tube 11. Stachys.
 Plants glabrous; leaves narrowed at base 12. Physostegia.
 Leaves round 13. Lamium.
 Anther-bearing stamens 2 14. Monarda.
 Upper lip of the corolla flat or convex (curving backwards).
 Flower clusters corymbose 17. Eriganum.
 Flower clusters sessile, axillary.
 Leaves nearly entire 18. Satureja.
 Leaves serrate 19. Melissa.

1. TEUCRIUM (GERMANDER)

Corolla deeply cleft between the 2 small lobes of the upper lip, but appearing 1-lipped, as the upper lobes are turned forward; the lower lobe the largest; stamens 4, exerted; nutlets rugose.

1. *T. occidentale* Gray. Stem villous, 3-6 dm. high; leaves ovate-lanceolate, dentate, villous beneath; calyx villous, viscid or glandular; flowers small, pink, white, or cream, in bracted spikes. Spence's Bridge.

2. SCUTELLARIA (SKULLCAP)

Not aromatic; corolla blue with an elongated, curved tube, dilated at the throat; calyx 2-lipped, the lips entire; the upper pair of stamens shorter; anthers ciliate, those of the upper pair 2-celled, those of the lower pair 1-celled. (Latin *scutella*, a dish).

Leaves entire, flowers axillary, large	1. <i>S. angustifolia</i> .
Leaves more or less serrate.	
Flowers axillary, large	2 <i>S. galericulata</i> .
Flowers racemose, small	3 <i>S. lateriflora</i> .

1. *S. angustifolia* Pursh. (NARROW-LEAVED S.) Almost glabrous, about 3 dm. high; leaves narrowly oblong, about 2 cm. long, nearly sessile; flowers 2.5 cm. long, solitary in the axils, the lower lip villous within. Dry soil, V. I. and D. I.; Pend d'Oreille Valley.

2. *S. galericulata* L. (MARSH S.) Puberulent, simple, 3-6 dm. high; leaves oblong-lanceolate, nearly sessile, the lower 4 cm. long; flowers 1.5-2 cm. long, solitary in the axils; the lower lip not villous within. Moist soil, common; Alaska to Col.

3. *S. lateriflora* L. (MAD-DOG S.) Glabrous, 2-6 dm. high; leaves ovate-lanceolate, petioled, 3-9 cm. long, coarsely serrate, the teeth blunt; flowers 5-8 mm. long, in axillary racemes. Wet soil, common.

3. MARRUBIUM (HOREHOUND)

Rather tall perennials with white-woolly stems and rugose leaves; the upper lip of the corolla erect, with 2 narrow lobes, the lower 3-cleft; stamens 4. (Hebrew marrob, a bitter juice).

1. *M. vulgare* L. Leaves round, dentate-crenate; flowers in dense, axillary clusters; corolla small, white; the throat of the calyx woolly, Common in waste places.

4. NEPETA (CAT MINT)

Leaves more or less crenate-toothed; calyx tubular, nearly equally 5-toothed, corolla twice as long, the middle lobe of the lower lip 2-lobed or entire; anthers in pairs, the cells diverging. (The Latin name).

1. *N. Cataria* L. (CATNIP). Erect, downy, 3-8 dm. high; leaves cordate, crenate-dentate; flowers in cymose clusters; corolla white or purplish-dotted. A common introd. weed.

2. *N. hederacea* (L.) Trev. (CREEPING CHARLIE, GROUND IVY). Creeping, leaves round-kidney-shaped, crenate; corolla twice the length of the calyx, blue or purplish. (*N. Glechoma*). Common, introd.

5. MICROMERIA (YERBA BUENA)

Puberulent, trailing, aromatic perennials; calyx tubular, the teeth acute; corolla small, white, about twice as long as the calyx; stamens 4, included. (Greek *mikros*, small, and *meros*, a part, in allusion to the 2-lipped corolla).

1. *M. Douglasii* Benth. Leaves round-ovate, slightly serrate, often purple; flowers solitary on pedicels about 3 times as long. Dry woods, V. I.; North Vancouver; Armstrong; Kootenay Lake; South Slokan.

6. DRACOCEPHALUM (DRAGON HEAD)

Leaves sharply serrate; the corolla little longer than the unequally toothed calyx; the middle lobe of the lower lip notched; flowers usually in a dense, terminal cluster; anthers in pairs, the cells diverging. (Greek *drakon*, a dragon, and *kephale*, a head).

1. *D. parviflorum* Nutt. Annual or biennial, 2-5 dm. high; corolla bluish, not much longer than the largest calyx-tooth. Okanagan Valley to the Skeena and eastw.

7. AGASTACHE (GIANT HYSSOP)

Tall perennials with sharply serrate leaves and small flowers; calyx unequally 5-toothed; upper lobes of the corolla 2-lobed, the lower 3-lobed, the middle lobe crenate; stamens divergent, the lower pair of filaments crossing

the upper; anther cells parallel. (Greek *agan*, much, *stachys*, an ear of corn, in reference to the many spikes).

1. *A. fœniculum* (Pursh). Ktze. Leaves pale and minutely downy beneath; calyx purplish, the teeth lanceolate acute; corolla blue; flowers in an interrupted spike. (*A. anethiodora* Brit.) *A. urticifolia* (Benth.) Rydb. Leaves green on both sides. May occur in the South East.

8. LEONURUS (MOTHERWORT)

Tall perennials, with close whorls of flowers; calyx 5-nerved, nearly equally 5-toothed; the upper lip of the corolla somewhat arched, entire; the middle lobe of the lower lip entire. (Greek *leon*, a lion, and *oura*, a tail).

1. *L. cardiaca* L. The cut-lobed leaves long petioled, the upper merely toothed; corolla pale-purple, the upper lip densely bearded; calyx-teeth spiny. Waste places across the continent; B.C.?

9. PRUNELLA (SELF-HEAL)

Low perennials, the flowers in a terminal spike, in 3's in the axils of the broad bracts; the upper lip of the corolla arched, the middle lobe of the lower lip denticulate; filaments 2-toothed at apex, the lower teeth bearing the anther. (*Brunella*; Ger. Braune, quinsy, for which this plant was a reputed remedy).

1. *P. vulgaris* L. (HEAL-ALL). Leaves entire or toothed, hairy or smoothish; corolla violet or sometimes pink, 10-20 mm. long; calyx mostly purplish. Common.

Prof. Fernald distinguished the following vars. and forms:

Principal stem-leaves ovate or ovate-oblong, rounded at base, about $\frac{1}{2}$ ($\frac{2}{5}$ - $\frac{3}{4}$) as long as broad (introduced plants).	
Plant sparingly pilose	<i>P. vulgaris</i> .
Plant vilose-hispid	Var. <i>hispida</i> .
Principal stem-leaves lanceolate to oblong, gradually narrowed or cuneate at base, about $\frac{1}{2}$ ($\frac{1}{2}$ - $\frac{1}{2}$) as broad as long (native plants).	
Bracts of inflorescence with margins copiously bristly-ciliate with long white hairs; glabrous or sparingly pilose on the back.	
Calyx green, or at most with purple-tinged margins, corolla blue or violet.	
Calyx purple, corolla blue or violet	Var. <i>lanceolata</i> .
Bracts of inflorescence with glabrous or sparingly short-ciliate margins, glabrous or sparingly pilose on back.	Forma <i>iodocalyx</i> .
Corolla violet	Var. <i>calvescens</i> .
Corolla pink	Forma <i>erubescens</i> .

P. vulgaris var. *lanceolata* (Barton) Fernald. Alaska to Idaho; forma *iodocalyx* Fernald. Goldstream, V. I. to Nova Scotia; var. *calvescens* Fernald. Corolla often 2 cm. long, while in the introd. forms it is much shorter. V. I.; Elgin; Selkirks; forma *erubescens* f. n. Cameron Lake, V. I.

10. GALEOPSIS (HEMP-NETTLE)

Erect, branching herbs, the flowers in clusters in the upper axils; calyx campanulate with spinulose teeth, corolla-tube narrow with an expanded throat, 2-lipped, the upper lip concave, entire, the lower spreading, 3-cleft, the middle lobe obcordate or emarginate, stamens 4, the anterior pair longer, the inner anther-valves ciliate, style 2-cleft.

1. *G. Tetrahit* L. Rough-hairy, 4-9 dm. high; the stems swollen below the joints; leaves ovate; corolla 15-20 mm. long, purplish white or variegated, about twice as long as the equally-toothed calyx. Sparingly introduced, New Westminster.

11. STACHYS (HEDGE NETTLE)

Tall perennials, the teeth of the leaves somewhat blunt, calyx 5-10 nerved, equally 5-toothed, corolla not dilated in the throat, purple or red, the upper

lip arched, mostly entire, the lower spreading, the middle lobe the largest, nearly entire; flowers in whorls in the axils of reduced upper leaves, and thus often spicate. (Greek *stachys*, a spike).

1. *S. ciliata* Dougl. Stems 6-12 dm. high, scabrous in the angles; the pubescence spreading; leaves ovate, more or less cordate, petiolate, coarsely crenulate-serrate, with sparse spreading pubescence; flowers 2-2.5 cm. long, in remote or approximate whorls, corolla red-purple, the lower lip equaling or longer than the upper. (*S. Cooleyæ*). West of the Cascades. Var. *pubens* Gray. Leaves often cordate, rather densely pubescent, especially beneath; calyx glandular-pubescent, its lobes ending in a short prickly tip; flowers often smaller. Lower Fraser.

2. *S. palustris* L. Stem hirsute, 3-6 dm. high; leaves lanceolate, sessile finely crenate-serrate; flowers 5-10 in a whorl; corolla 12 mm. long, pale-purple, red-spotted. Wet ground, east of Cascades; Armstrong.

12. PHYSOSTEGIA (FALSE DRAGON-HEAD)

Tall glabrous perennials with sharply serrate or denticulate leaves and large pink or purplish flowers in bracted spikes; calyx faintly 10-nerved, equally 5-toothed, corolla much longer than the calyx, the throat much inflated, the upper lip entire, the middle lip of the lower emarginate. (Greek *phusa*, a bladder, and *stegē*, a covering, in allusion to the somewhat inflated fruiting calyx).

1. *P. parviflora* Nutt. Leaves lanceolate, calyx-teeth short and blunt, corolla 1-1.5 cm. long. Spence's Bridge to Sask.

13. LAMIUM (DEAD NETTLE)

Decumbent; calyx about 5-nerved, nearly equally 5-toothed; corolla inflated in the throat, the upper lip arched, the middle lobe of the lower lip much the largest, emarginate, contracted to a stalk-like base. (Greek *laimos*, the throat, in allusion to the gaping corolla).

1. *L. amplexicaule* L. (HEN-BIT). Annual, leaves round, deeply crenate; flowers whorled in the axils of the upper clasping leaves; corolla purplish, 1.5 cm. long, the upper lip bearded, the lower spotted. Sparingly introd., Comox.

14. MONARDA (HORSEMINT, BERGAMOT MINT)

Aromatic, leaves serrate, flowers large; calyx tubular, elongated, 15 nerved, sub-equally 5-toothed, hairy in the throat; corolla strongly 2-lipped, pubescent without, the upper lip erect, narrow, the lower spreading, 3-lobed; the middle lobe narrowest.

1. *M. mollis* L. Stem pubescent, especially at the nodes, 3-5 dm. high; leaves short-petioled, (punctate in dried spec.) ovate-oblong, serrate, more or less cordate, acute, usually pubescent beneath; flowers in a terminal head, 2.5 cm. long, pink, the stamens longer than the upper lip; bracts large, green, or pinkish tinged. D. I.; Okanagan.

15. LYCOPUS (WATER HOREHOUND)

Mint-like, glabrate plants, slightly aromatic, usually stoloniferous, with sharply serrate, lanceolate leaves, and small dense clusters of small white flowers; calyx bell-shaped, 4-5 toothed, naked in the throat; anther-bearing stamens 2, the upper pair rudimentary or wanting. (Greek *lycos*, a wolf, *pous*, a foot, from some fanciful resemblance of the leaves).

Some of the leaves laciniately toothed 1. *L. americanus*.
Leaves serrate.

Calyx-lobes obtuse, shorter than the nutlets 2. *L. uniflorus*.
Calyx-lobes acuminate, longer than the nutlets 3. *L. lucidus*.

1. *L. americanus* Muhl. Slender, 2-6 dm. high, glabrate except at the nodes, the upper leaves often merely serrate, all short-petioled, calyx-teeth short-cuspidate; sterile filaments conspicuous (*L. sinuatus*). Atlantic to Pacific; Vernon.

2. *L. uniflorus* Michx. (BUGLE WEED). Glabrate, except the pubescent stem, from a tuberous base; in late summer producing tuberiferous stolons; leaves thin, not more than 7 cm. long, coarsely serrate; corolla exceeding the calyx, the lobes spreading. Low ground, Atlantic to Pacific; Vancouver.

3. *L. lucidus* Turez. Glabrate or pubescent, rather stout, 2-9 dm. high; leaves coarsely serrate, subpetiolate, elongate, 5-12 cm. long; corolla hardly exceeding the calyx. Low ground, Kamloops to Manitoba.

16. MENTHA (MINT)

Aromatic perennials with small whitish or purplish flowers; corolla with a short included tube, the upper of its 4 lobes the broadest; stamens 4, distinct. (Minthe was a Greek nymph fabled to have been changed to a mint).

Flowers axillary.

Upper leaves not reduced 1. *M. canadensis*.

Upper leaves reduced 2. *M. cardiaca*.

Flowers mostly terminal.

Spikes slender, leaves sessile. 3. *M. spicata*.

Spikes thick, leaves petioled.

Leaves lanceolate, calyx pubescent 4. *M. piperita*.

Leaves ovate, calyx glabrous 5. *M. citrata*.

1. *M. canadensis* L. (CANADA MINT). Simple or branching, stems retrorsely pubescent at least on the angles; leaves pubescent, lanceolate, narrowed at the base, mostly petioled. Atlantic to Pacific, on wet ground. Var. *lanata* Piper. Stems and lower surface of the leaves tomentose. Common.

2. *M. cardiaca* Gerardi. Tall and erect, with ascending branches towards the top; upper leaves 2-3 times longer than the clusters, lanceolate serrate, slightly pubescent, (*M. sativa*). Wet places, Kootenay, introd.

3. *M. spicata* L. (SPEARMINT). Glabrate, branching; leaves oblong-lanceolate, finely and unequally serrate, sessile or sometimes short-petioled; bracts linear-subulate, conspicuous; spikes 2-4 cm. long, 5 mm. wide. Introd., Moodyville.

4. *M. piperita* L. (PEPPERMINT). Glabrous; leaves ovate-oblong to lanceolate, sharply serrate; calyx glabrous below, the teeth hirsute. Widely introd., B.C.?

5. *M. citrata* Ehrh. Glabrate; leaves petioled, ovate, often purplish, coarsely appressed-serrate; flowers in roundish heads, terminal, or also in the upper axils. Introd., Vancouver.

17. ERIGANUM (WILD MARJORAM)

Tall perennials with nearly entire leaves; calyx about 13-nerved, hairy in the throat with 5 acute teeth; the upper lip of the corolla erect, slightly notched, the lower of 3 nearly equal lobes; stamens exserted, diverging. (Greek *eros*, a mountain, and *gonos*, an ornament).

1. *E. vulgare* L. About 6 dm. high, leaves ovate, petioled; flowers purplish or white, bracts ovate, purplish or green. Introd., Elgin.

18. SATUREJA (BASIL)

Calyx 10-13-nerved, corolla purplish or pink, with a straight lobe and an inflated throat; the upper lip entire or notched, flattish; the lower spreading, stamens 4, ascending. (The Latin name).

1. *S. vulgaris* (L.) Fritsch. Hairy, erect, 2-6 dm. high; leaves ovate-oblong, obtuse; flowers in dense clusters with conspicuous setaceous bracts; corolla pinkish (*Calamintha clinopodium*). Sparingly introd., New Westminster.

19. MELISSA (BALM)

Calyx hairy within, the upper lip flattened, 3-toothed, the 2 teeth of the lower lip longer; corolla-tube curved; not much longer than the calyx; stamens 4; flower-clusters one-sided, the few bracts leafy. (Greek *melissa*, a bee).

1. *M. officinalis* L. Branching, perennial, pubescent; about 4 dm. high; leaves ovate, serrate, lemon-scented; corolla pale-purple or nearly white. Sparingly introd., Moodyville.

SOLANACEÆ (POTATO FAMILY)

Herbs (or shrubs) with alternate exstipulate leaves and regular, perfect, 5-merous flowers on bractless pedicels; corolla regular, plaited in the bud, the stamens alternate with 5 lobes; style 1, stigma mostly simple; ovary superior, 2- (rarely 3-5-) celled; placenta axial, often projecting into the cells; fruit a many-seeded capsule or berry. A large family, mostly tropical, including the Tomato, and the Petunia.

Fruit prickly	1. <i>Datura</i> .
Fruit a smooth capsule	2. <i>Nicotiana</i> .
Fruit a berry.	
Fruiting calyx inflated, anthers distinct, flowers yellow	3. <i>Physalis</i> .
Fruiting calyx not inflated, anthers connivent about the style, flowers white	4. <i>Solanum</i> .

1. *DATURA* (THORNAPPLE, STRAMONIUM)

Poisonous weeds with ovate leaves and large flowers; calyx 5-toothed, half as long as the tubular corolla; stigma 2-lobed; capsule 4-valved, 4-celled; seeds large, flat. (Arabic name).

1. *D. Stramonium* L. Annual, glabrous, 3-5 dm. high, calyx prismatic; corolla tubular, white, 5-8 cm. long; fruit about 2.5 cm. long, the upper prickles largest. Occasional in the dry interior.

2. *NICOTIANA* (TOBACCO)

Acrid, clammy-pubescent herbs with large leaves and racemed or panicle flowers; calyx tubular-campanulate; corolla salver-form with a long tube, stigma capitate.

1. *N. attenuata* Torr. Stem 3-6 dm. high, glandular above, leaves petioled the lower ovate-oblong, the upper oblong-lanceolate and acuminate to linear; corolla greenish-white, the tube 2-3 cm. long; capsule nearly twice as long as the calyx. Sandy soil, Lytton.

3. *PHYSALIS* (GROUND CHERRY)

Annuals; the peduncles solitary in the axils; calyx 5-angled, completely enclosing the fruit; corolla yellowish, rotate, obscurely 5-lobed; anthers distinct, opening longitudinally. (Greek *physalis*, a bladder, in allusion to the inflated calyx).

1. *P. pubescens* L. Stem spreading, much branched, usually villous-pubescent; leaves ovate, entire or repand-dentate, sometimes nearly glabrous; peduncles in fruit 1 cm. long; corolla yellow with a dark centre, fruit a yellow berry. In cultivated ground, Cache Creek.

4. *SOLANUM* (NIGHTSHADE)

Herbs or shrubs with axillary or extra-axillary peduncles; corollas rotate, 5-lobed; stamens with short filaments more or less united by the anthers which dehisce by pores at the tip; fruit a 2-celled berry. (Latin *solamen*, quieting, narcotic).

1. *S. nigrum* L. Erect or prostrate, 2-6 dm. high, much branched, nearly glabrous, the stems rough on the angles; leaves ovate, entire, dentate, or wavy; flowers white, in small umbellate drooping clusters; calyx-lobes ovate; berries black. Common.

2. *S. triflorum* Nutt. (WILD TOMATO). Scurfy, hairy-pubescent to nearly glabrous, annual, 3-6 dm. high; leaves oblong in outline, 4-8 cm. long, pinnatifid, the lobes acute, the sinuses rounded; corolla white; calyx-lobes oblong-lanceolate; berries green. Savona.

3. *S. Dulcamara* L. (BITTERSWEET). Pubescent, climbing; leaves with 2 large lobes at the base; flowers blue or purple in slender erect cymes; berries ovoid, red. Hope. Often cultivated.

SCROPHULARIACEÆ (FIGWORT FAMILY)

Herbs; stamens inserted on corolla, usually didynamous, sometimes 2, or 4 with a rudimentary or imperfect fifth; corolla mostly irregular, more or less 2-lipped; fruit a free, 2-celled, many-seeded pod, the placentæ axial; style single, usually 2-lobed.

- Anther-bearing stamens 5; corolla rotate; leaves alternate . . . 1. *Verbascum*.
 Anther-bearing stamens 2 or 4; leaves opposite or alternate.
 Corolla spurred at the base . . . 2. *Linaria*.
 Corolla not spurred at base.
 Corolla saccate or gibbous.
 Throat closed by the palate or the lower lip, flowers large . . . 3. *Antirrhinum*.
 Throat open, flowers small, blue . . . 4. *Collinsia*.
 Corolla neither spurred nor saccate, or wanting in No. 10.
 A fifth sterile or rudimentary stamen present.
 Sterile stamen rudimentary, a mere gland or scale, corolla short.
 Low annuals, flowers blue . . . 4. *Collinsia*.
 Tall perennials, flowers lurid . . . 5. *Scrophularia*.
 Sterile stamen filiform or spatulate, corolla long.
 Seeds wingless, anthers woolly or glabrous . . . 6. *Pentstemon*.
 Seeds winged, anthers woolly . . . 7. *Chelone*.
 Stamens 2 or 4, no rudimentary fifth present.
 Anther-bearing stamens 2, sterile stamens 2.
 Calyx 5-lobed . . . 8. *Gratiola*.
 Calyx 4-lobed . . . 9. *Ilysanthes*.
 Stamens all fertile.
 Stamens 2.
 Calyx 5-parted . . . 8. *Gratiola*.
 Calyx 4-parted.
 Leaves alternate, mostly basal . . . 10. *Synthyris*.
 Leaves, at least the lower, opposite . . . 11. *Veronica*.
 Stamens 4.
 Corolla regular or nearly so, flowers on scape-like peduncles . . . 12. *Limosella*.
 Corolla irregular, 2-lipped stems leafy.
 Stamens not enclosed by the broad upper lip.
 Leaves opposite, calyx-tube 5-angled . . . 13. *Mimulus*.
 Leaves alternate, calyx 5-parted . . . 14. *Digitalis*.
 Stamens enclosed in the hooded or folded upper lip (galea).
 Anther-cells dissimilar, the inner one pendulous by its apex, leaves alternate.
 Galea long, the lower lip small . . . 15. *Castilleja*.
 Galea not much longer than the saccate lower lip . . . 16. *Orthocarpus*.
 Anther-cells similar and parallel, leaves mostly opposite.
 Capsule 2-4 seeded . . . 17. *Melampyrum*.
 Capsule many seeded.
 Calyx inflated, seeds winged . . . 18. *Rhinanthus*.
 Calyx not inflated, seeds wingless.
 Low, 1 dm. high or less, flowers 5-7 mm. long . . . 19. *Euphrasia*.
 Tall, 3 dm. high or more, flowers large, beaked or hooded . . . 20. *Pedicularis*.

1. VERBASCUM (MULLEIN)

Tall perennials with alternate leaves and large yellow or purple flowers in terminal spikes or racemes; calyx 5-parted; corolla rotate, the 5 lobes subequal; stamens 5, unequal, all anther-bearing; style dilated at apex. (The Latin name).

1. *V. Thapsus* L. (COMMON M.) Densely woolly; stems 6-15 dm. high, winged by the decurrent bases of the large, denticulate, woolly leaves; flowers yellow, in a dense spike; lower stamens usually beardless. Introd. Dry ground, V. I. and Islands of the Gulf of Georgia; Vernon, etc.

2. *V. Blattaria* L. (MOTH M.) Green, glabrate or sparingly glandular-pubescent above; lower leaves doubly serrate, the upper partly clasping; raceme loose; corolla yellowish or purplish; filaments all bearded. Introd., New Westminster.

2. LINARIA (TOAD FLAX)

Herbs; leaves mostly alternate; flowers solitary or racemed; calyx 5-parted, corolla spurred at base; stamens 4, didynamous; the capsule opening by chinks or pores. (*L. linum*, flax, which some species resemble in foliage).

Stems trailing, flowers solitary	1. <i>L. Cymbalaria</i> .
Stems erect, flowers racemose.	
Flowers yellow	2. <i>L. vulgaris</i> .
Flowers blue or purplish	3. <i>L. canadensis</i> .

1. *L. Cymbalaria* (L.) KENILWORTH IVY. Glabrous; rooting at the nodes; leaves reniform-orbicular, 5-9-lobed; corolla blue, 5 mm. long; peduncles 2-3 cm. long, recurved in fruit. A casual garden escape; Pt. Atkinson, Vancouver; Nanaimo.

2. *L. vulgaris* Mill. (BUTTER AND EGGS). Glabrous; 2.5-6 dm. high; leaves linear-oblong, mostly alternate, entire; flowers 2.3 cm. long in a dense raceme, light-yellow with an orange swelling in the throat. A common garden escape.

3. *L. canadensis* (L.) Dumont. Glabrous; stems slender, simple, 2-5 dm. high; leaves linear, 2 cm. long, some of them usually opposite; flowers on a slender raceme on short pedicels; corolla 5-8 mm. long, (or wanting in cleistogamous forms). Dry bluffs, Pt. Atkinson; Departure Bay; extending eastward to the Atlantic; not common.

3. ANTIRRHINUM (SNAPDRAGON)

Herbs with entire, linear, alternate or opposite leaves, and flowers in an open panicle; calyx 5-cleft; stamens 4, didynamous, the fifth represented by a scale; capsule septicidally dehiscent. (Greek *anti*, and *rhis*, a snout, in allusion to the form of the corolla).

1. *A. Orontium* L. Slender, annual, 2-3 dm. high; pubescent or smoothish; leaves linear; flowers purple, 1-1.5 cm. long; calyx-lobes linear, longer than the capsule. Introd. Victoria. *A. majus* L. The Snapdragon of the gardens, flowers red or variegated, 2-4 cm. long.

4. COLLINSIA (BLUE-EYED MARY)

Annuals with opposite or verticillate leaves, and variegated, blue, purple, and white flowers in the axils; calyx campanulate, 5-cleft, corolla lipped, gibbous; the middle lobe of the lower lip keel-like and enclosing the 4 stamens; the fifth stamen represented by a gland. (Collins was an American botanist).

1. *C. grandiflora* Dougl. Glabrous or puberulent, 0.5-4 dm. high; the lowest leaves orbicular, petioled, the upper oblong, denticulate, the uppermost often in whorls of 3; corolla 10-14 mm. long, the tube shorter than the limb, the upper lip spotted towards the throat, the tube strongly saccate; pedicels more or less deflexed in fruit, seeds not margined, concave. Common, V. I. Var. *pusilla* Gray. Corolla 8-10 mm. long, the upper lip with a transverse line of spots, pedicels mostly erect in fruit, some of the seeds winged slightly. Victoria; Bowen Is.; Kamloops.

2. *C. parviflora* Dougl. Glabrous or puberulent, 0.5-4 dm. high, stem weak, the branches spreading, leaves oblong-lanceolate, 1-4.5 cm. long, the upper often in whorls of 3-5, entire or denticulate; corolla 5-7 mm. long, the tube longer than the limb, not very strongly saccate, white and blue; seeds concave, not margined, the peduncles erect, spreading or deflexed in fruit. Spence's Bridge; Rossland; Rockies.

5. SCROPHULARIA (SCROPHULARY)

Tall, branching perennials with opposite ovate leaves, and flowers in an open panicle; calyx 5-cleft; stamens 4, didynamous, glandular, the fifth represented by a scale, the filament adherent to the corolla; capsule septicidally dehiscent. (A reputed remedy for scrofula).

1. *S. californica* Cham. Puberulent or nearly glabrous, 6-9 dm high; leaves ovate, coarsely serrate, the teeth slightly serrate or entire; inflorescence branching, glandular, leafless, with small bracts; flowers scattered, greenish-purple, 1 cm. long or less, producing abundant nectar, the lateral lobes slightly inflexed; sterile stamen spatulate or cuneiform, calyx cleft nearly to the base; the segments round-elliptical, capsule ovoid. Moodyville; Albérni; Griffin Lake.

2. *S. occidentalis* (Rydb.) Bick. More or less soft-pubescent and glandular; stout, 5-12 dm. high; leaves ovate, doubly and sharply serrate or incised; inflorescence with short branches, and numerous somewhat clustered flowers, lateral lobes of calyx erect; calyx-segments round-elliptical, obtuse, purplish; sterile stamen orbicular-obovate; capsule ovoid. (The Western representative of *S. marylandica*). Kootenay; Creston.

6. PENTSTEMON (BEARD-TONGUE)

Perennials with opposite entire or tufted leaves; calyx 5-parted; corolla tubular or dilated in the throat, 2-lipped, the upper lip 2-lobed, the lower 3-lobed; stamens 4, the fifth reduced to a filament; seeds numerous, not winged; style filiform, stigma entire. (Greek *pente*, five, *stemon*, a stamen, in allusion to the fifth sterile stamen).

Anthers woolly.

- | | |
|--|---------------------------|
| Leaves roundish, 5-15 mm. long | 1. <i>P. Menziesii</i> . |
| Leaves oblong or lanceolate, longer. | |
| Stems herbaceous; leaves 6 cm. or more in length | 4. <i>P. Lyallii</i> . |
| Stems shrubby; leaves shorter. | |
| Calyx-lobes acute, leaves 3-5 mm. broad | 3. <i>P. fruticosus</i> . |
| Calyx-lobes acuminate, leaves 5-10 mm. broad | 2. <i>P. Scouleri</i> . |

Anthers not woolly.

- | | |
|---|----------------------------|
| Anther-cells splitting their whole length, mostly divaricate. | |
| Flowers white, yellow or brownish. | |
| Inflorescence paniculate | 5. <i>P. deustus</i> . |
| Inflorescence verticillate | 6. <i>P. confertus</i> . |
| Flowers blue or purple. | |
| Stems or peduncles glandular above. | |
| Flowers 12-18 mm. long | 9. <i>P. humilis</i> . |
| Flowers 20-25 mm. long | 10. <i>P. glaucus</i> . |
| Stems and peduncles not glandular above. | |
| Plants 6-9 dm. high, leaves ovate, evergreen, inflorescence paniced | 8. <i>P. ovatus</i> . |
| Lower leaves lanceolate, not evergreen, inflorescence verticillate | 7. <i>P. procerus</i> . |
| Anther-cells opening at apex, horse-shoe shaped. | |
| Leaves lanceolate to ovate, corolla 15-25 mm. long | 11. <i>P. diffusus</i> . |
| Leaves lanceolate, corolla 10-15 mm. long | 12. <i>P. triphyllus</i> . |

1. *P. Menziesii* Hook. Shrubby, usually glabrous, except the glandular, racemose inflorescence; prostrate, forming mats, the branches 5-15 cm. high; leaves thick, obovate to oblong, 5-15 mm. long, denticulate, evergreen; flowers few; sepals lanceolate, acute; corolla purple 2.5-3.5 cm. long, the sterile filaments bearded. Summits, Coast and Cascade Mts.

2. *P. Scouleri* Dougl. Puberulent below, glandular-pubescent above, 1-3 dm. high; in patches; leaves lanceolate to linear-lanceolate, acute, serrulate, those of the flowering stem smaller, linear-oblong, often obtuse; flowers purple, racemose, 3-4 cm. long; sepals acuminate. Common, Yale to Crow's Nest Pass.

3. *P. fruticosus* (Pursh.) Greene. Shrubby, decumbent, 2-4 dm. high; leaves thickish, oblong-elliptical, 1.5-3 cm. long; not evergreen (?); serrulate or almost entire, often obtuse; sepals lanceolate, not acuminate, glandular; corolla blue-purple, 2.5-3 cm. long, sterile filament glabrous. Mts.; Roger's Pass.

4. *P. Lyallii* Gray. Tall, 5-6 dm. high, herbaceous; leaves 7-12 cm. long, linear-lanceolate, thinner, sharply serrate, lobes of the long sepals attenuate-acuminate, corolla 3-4 cm. long. Crow's Nest Pass.

5. **P. deustus** Dougl. Glabrous, or the calyx slightly glandular, 1-3 dm. high; shrubby below; leaves coriaceous, ovate to oblong-linear, usually serrate; inflorescence virgate or paniculate, mostly many-flowered; corolla dull white or rarely tinged purple, 10-12 mm. long; sterile filament glabrous. Idaho boundary.

6. **P. confertus** Dougl. Glabrous or the inflorescence puberulent, 2-5 dm. high; leaves oblong-lanceolate, usually entire; inflorescence appearing verticillate, but the lower clusters on erect, appressed peduncles; flower-clusters usually 4-6; sometimes 9, flowers yellow, or sometimes brownish, more or less deflexed; sterile filament bearded, equaling the fertile; sepals ovate with scarious and more or less erose margins; corolla 8-10 mm. long. East of the Cascades; Okanagan; Crow's Nest Pass.

• 7. **P. procerus** Dougl. Similar, lower; flower-clusters usually 2 or 3, sepals lanceolate with scarious, entire, erose or dentate margins. Mt. Cheam; Kamloops; Rockies; Peace River.

8. **P. ovatus** Dougl. Puberulent, stout, 6-9 dm. high; leaves ovate, thick, more or less sub-cordate, entire or coarsely toothed; inflorescence paniculate, corolla blue, 16-20 mm. long; sepals ovate, more or less glandular; sterile, filament bearded at apex. Wooded banks; Hope.

9. **P. humilis** Nutt. Glabrous below, the inflorescence glandular, 1-3 dm. high; stem leaves oblong to lanceolate, the basal elliptical, all mostly entire, inflorescence in a narrow panicle, the peduncles 1-5 flowered; sepals ovate, scarious-margined, not $\frac{1}{4}$ as long as the corolla; corolla narrowly funnel-form, 12-18 mm. long, bright blue or sometimes white, the lower lip hairy within, (*P. pseudohumilis* Rydb.) Rockies; Fernie. •

10. **P. glaucus** Graham. Glabrous to the inflorescence, more or less glaucous; 1-4 dm. high; leaves thickish, oblong-lanceolate or oblong-ovate below, 3-5 cm. long; entire or denticulate; inflorescence villous-pubescent and viscid or glandular, of crowded axillary clusters, short and compact; corolla purplish 20-25 mm. long, with a narrow tube, campanulate-ventricose above, sterile filament bearded. Rockies, northward.

11. **P. diffusus** Dougl. Glabrous or puberulent, stems numerous, diffuse, 2-5 dm. high; leaves thin, ovate-lanceolate, sharply and closely serrate; inflorescence short, pedicels mostly shorter than the ciliate-lanceolate sepals; corolla funnel-form, 2 cm. long, the lobes spreading. Valleys of mt. streams west of Cascades; Capilano; Cowichan, and in the Coast Mts.

12. **P. triphyllus** Dougl. Stems slender, 3-4 dm. high, usually simple, leaves lanceolate to linear, 2-3 cm. long, thick, the upper sometimes in 3's; inflorescence loosely paniculate, corolla narrow, 10-15 mm. long. Rocky banks; Oregon to B.C. (Gray).

7. CHELONE (TURTLEHEAD)

Tall perennials with opposite leaves and (in ours) large red-purple flowers in an open panicle; flowers much as in *Pentstemon*; the corolla somewhat inflated above; the fifth stamen shorter than the other 4, bearded on its upper half; stigma slightly capitate. (Greek *chelone*, a tortoise; the flower resembles the head).

1. **C. nemorosa** Dougl. Stem minutely puberulent below, 3-9 dm. high; inflorescence crisp-pubescent, slightly glandular; leaves ovate or broadly lanceolate, short-petioled below, 5-10 cm. long, serrate; corolla glandular-pubescent without, about 3 cm. long, 2-lipped; pedicels slightly longer than the calyx; seeds winged, reticulated. Along mt. streams, Cameron Lake, V. I.; Rockies, southw.

8. GRATIOLA (HEDGE HYSSOP)

Low herbs with sessile leaves and peduncled flowers solitary in the axils; the upper lip of the corolla 2-lobed, the lower 3-lobed; fertile stamens 2, sterile stamens 2, simple, minute or none, anther-cells distinct; stigma dilated. (*L. gratia*, favor, in allusion to supposed medicinal qualities).

1. *G. virginiana* L. Stem clammy-pubescent, 1-2.5 dm. high, leaves lanceolate with a narrow base, entire or denticulate, calyx with a pair of foliaceous bracts, the calyx-lobes half as long as the corolla; corolla whitish, the tube yellowish, sterile filaments small or none; pod ovoid, equaling the calyx. Wet or muddy places, Kootenay; Victoria; Comox.

2. *G. ebracteata* Benth. Nearly glabrous, or minutely glandular, 0.5-1.5 dm. high; leaves lanceolate, entire, or denticulate, with a broadish base; calyx without bractlets, the sepals hardly equaling the corolla; corolla yellowish with pink lobes; pod globose, 4 angled, shorter than the calyx. In water or wet places, Nanaimo; Bowen Is.; Kamloops.

9. ILYSANTHES (FALSE PIMPERNEL)

Low, glabrous annuals with purplish flowers solitary in the axils on filiform pedicels or the upper racemed; upper lip of the corolla 2-lobed, the lower 3-lobed, spreading; fertile stamens 2, the sterile filaments 2, forked, one of the lobes glandular, larger, anther-cells divergent; stigma 2-lobed. (Greek *ilyis*, mud, *anthos*, a flower).

1. *I. dubia* (L.) Barnhart. Branched, spreading; leaves ovate to oblong, crenate, the upper partly clasping, the lower narrowed at the base; the lower pedicels about as long as the leaves; calyx-lobes linear, slightly exceeding the pod. (*I. agratioloides* Benth.) S. Kootenay; introd., New Westminster.

10. SYNTHYRIS

Low perennials with small blue or pink flowers in terminal spikes or racemes; calyx 4-parted, the segments oblong; corolla 4-cleft, more or less irregular, wanting in ours; stamens 2 (rarely 4) exerted, anther-cells parallel; stigma small, capitate; capsule obtuse or emarginate. (Greek *syn*, together, *thuris*, a door, in allusion to the valves of the pod).

1. *S. rubra* Benth. Softly pubescent; herbage often reddish, lower leaves orbicular to ovate, crenate, the upper small, sessile; corolla wanting, calyx-lobes ovate-lanceolate, capsule longer than the calyx. Open ridges, Flat-head River.

11. VERONICA (SPEEDWELL)

Annual or perennial; leaves mostly opposite; flowers blue or whitish, axillary or in terminal racemes; calyx mostly 4-parted, the lobes oblong or ovate; corolla rotate, 4-lobed, stamens 2, the cells confluent at the apex; style slender, with a small, capitate stigma; capsule more or less flattened, emarginate or obcordate. (The flower of St. Veronica).

Annuals, flowers axillary, the floral leaves more or less reduced.

Pedicels very short.

Leaves mostly oblong, corolla white

1. *V. peregrina*.

Leaves ovate, corolla blue

2. *V. arvensis*.

Pedicels equaling or exceeding the stem leaves.

Capsule many-seeded, flowers large

3. *V. Tournefortii*.

Capsule 1-2-seeded, flowers small

4. *V. agrestis*.

Perennials.

Flowers axillary, the floral leaves more or less reduced.

All the leaves sessile, capsule emarginate, alpine

5. *V. alpina*.

Lower leaves petioled, capsule obcordate

6. *V. serpyllifolia*.

Flowers in axillary racemes.

Leaves long-linear

7. *V. scutellata*.

Leaves oblong to oval.

Plants nearly glabrous, aquatic.

Stem leaves sessile

8. *V. anagallis-aquatica*.

All the leaves petioled

9. *V. americana*.

Plants pubescent

10. *V. officinalis*.

1. **V. peregrina** L. (NECKWEED). Erect, glandular-puberulent or nearly glabrous, the lowest leaves short-petioled, the upper sessile, all oblong, usually glabrous, denticulate or entire; the floral leaves reduced; capsule orbicular, slightly notched. Damp soil; V. I.; Kamloops; Creston.

2. **V. arvensis** L. (CORN S.) Erect or diffuse, 1-2 dm. high, hairy; lower leaves petioled, ovate, crenate; the upper sessile, lanceolate, the floral reduced to bracts; corolla bluish, shorter than calyx; capsule pubescent, obcordate. Widely introd.

3. **V. Tournefortii** Gmel. Pubescent, stems spreading or ascending, 1-3 dm. high; leaves round to ovate-cordate, crenate, 1-2.5 cm. long, the floral little reduced; flowers 1 cm. broad, blue, the calyx-lobes lanceolate, spreading in fruit; capsule broadly obcordate with a broad shallow notch; seeds many, cup-shaped. Sparingly introd.; Okanagan.

4. **V. agrestis** L. (FIELD S.) Pubescent; stems decumbent, 1-2 dm. long, leaves round or ovate, crenate; flowers small, blue; calyx-lobes oblong; capsule broader than long, narrowly notched, seeds 1-2, cup-shaped. Introd., Okanagan.

5. **V. alpina** L. (ALPINE S.) Pubescent, glandular above, stem slender, ascending or erect, 1-3 dm. high; leaves pubescent, elliptical, sessile, entire or denticulate, 15-25 cm. long, flowers light-blue, 3-4 mm. broad on short pedicels; capsule ellipsoidal, emarginate. (*V. alpina* var. *Wormskjoldii*). Alpine meadows; Mt. Cheam, etc., Alaska.

6. **V. serpyllifolia** L. (THYME-LEAVED S.) Decumbent, creeping at the base, 0.5-3 dm. high; pubescent or glabrous; leaves ovate or oblong, denticulate or entire, the upper much-reduced, inflorescence puberulent, loose, the pedicels short; corolla pale-blue, with darker veins, 3-4 mm. broad; capsule broader than long, sometimes slightly glandular-ciliate. Roadsides and damp ground, V. I., eastward; Alaska.

7. **V. scutellata** L. (MARSH S.) Stems slender, weak, 1-5 dm. high; leaves long, linear, usually entire; racemes several, very slender; pedicels about 1 cm. long; flowers 3 mm. broad; capsule very flat, broader than long, broadly notched. Wet places, swamps, V. I., eastward.

8. **V. anagallis-aquatica** L. (WATER S.) Creeping, rooting at base, 1-10 dm. long; leaves ovate-lanceolate, more or less clasping by a cordate base, serrate or entire, 1 cm. long; leaves of sterile autumn shoots orbicular, petioled, 2-5 cm. long; flowers blue, 4 mm. broad; capsule orbicular, emarginate. Eastern boundary.

9. **V. americana** Schwein. (BROOKLIME). Perennial by stolons, glabrous; stem erect or decumbent and rooting, often very long, leaves oblong-lanceolate, 2-9 cm. long, serrate; short-petioled; racemes slender, elongated; corolla blue, rarely pink, 3-4 mm. broad; capsule orbicular, emarginate. Ditches and wet places everywhere; Alaska to Cal.

10. **V. officinalis** L. (COMMON S.) Pubescent throughout; stems ascending, 1-3 dm. high; leaves oval to obovate 2-4 cm. long, obtuse, serrate; racemes rather stout, crowded, spike-like, corolla pale-blue, 4-5 mm. broad, capsule triangular, hardly notched. Introd.; Rossland.

12. LIMOSELLA (MUDWORT)

Low, stemless, glabrous annuals, growing in mud; leaves basal; flowers small, white or purplish, solitary or naked peduncles; style club-shaped. (*L. limus*, mud, *sella*, a seat).

1. **L. aquatica** L. Leaves clustered at base, narrowly spatulate or with no blade distinct from the petiole. Brooks and brackish water. Edmonton to Wn.; probably in B.C.

13. MIMULUS (MONKEY FLOWER)

Annual or perennial herbs with opposite leaves and axillary, peduncled, red or yellow flowers; corolla 2-lipped, the upper lip erect or reflexed, 2-lobed, the lower spreading, 3-lobed; stamens 4, didynamous, stigma 2-lipped, the lobes sensitive, calyx angled. (L. dim. of *mimus*, a buffoon, from the grinning corolla).

Flowers red or white	1. <i>M. Lewisii</i> .
Flowers yellow.	
Calyx not angled	2. <i>M. pilosus</i> .
Calyx angled.	
Fruiting calyx much inflated, or in No. 3 merely distended	
Corolla under 20 mm. long.	
Stems terete	4a. <i>M. Langsdorfii</i> , var. <i>depauperatus</i> .
Stems 4-angled, calyx mostly purple-spotted	6. <i>M. nasutus</i> .
Corolla 20-25 mm. long.	
Calyx-teeth long, plants viscid	3. <i>M. Moschatus</i> .
Calyx teeth short, plants not viscid.	
Flowers 1-3	5. <i>M. alpinus</i> .
Flowers many	4. <i>M. Langsdorfii</i> .
Fruiting calyx not inflated, flowers small.	
Corolla with one or more dark spots, calyx oblique at orifice, the teeth unequal	7. <i>M. alsinoides</i> .
Corolla yellow, calyx-teeth subequal, the orifice not oblique.	
Plants erect	8. <i>M. peduncularis</i> .
Plants reclining	9. <i>M. floribundus</i> .

1. *M. Lewisii* Pursh. Viscid-hirsute, 4-6 dm. high; leaves oblong to lanceolate, denticulate, sessile, flowers on stout peduncles, 3-10 cm. long, calyx lobes triangular, very acute; corolla 2-3.5 cm. long. Mt. meadows and streams, not Alpine. Var. *alba*. Corolla white, smaller, the exerted part not equaling the calyx. With the species, Mt. Cheam; Crown Mt., North Vancouver.

2. *M. pilosus* (Benth.) Wats. Annual; pilose throughout; stem terete, 1-3 dm. high, branched from base; leaves lance-oblong, sessile, entire, 2.5-7 cm. long; peduncles slender, 2-4 cm. long; calyx nerveless, not prismatic nor angled, enlarged in fruit; the 5 lobes subulate, unequal; corolla 6-8 mm. long, obscurely bilabiate, yellow with a pair of brown spots on the lower lip. Swan Lake, V. I.

3. *M. Moschatus* Dougl. (MUSK FLOWER). Villous-viscid; stems slender, declined, often woolly, 3-5 dm. long, leaves ovate-oblong, slightly serrate, short-petioled; flowers solitary in the upper axils on pedicels 2-3 cm. long, calyx 10-15 mm. long, the lobes nearly equaling the tube, corolla a little more than twice the calyx; calyx teeth $\frac{1}{2}$ as long as the tube. Plants with a musky odor. Revelstoke. The common form is var. *sessilifolia* Gray. Leaves sessile, pedicels longer. Wet places, V. I., and west of the Cascades. The musky odor is apparently not characteristic of plants at the coast.

4. *M. Langsdorfii* Donn. Glabrous or pubescent above; stems terete, but somewhat angled, 1-9 dm. high, annual or rooting at the base and perennial; leaves ovate to orbicular, denticulate, often purple beneath; the lower petioled, often laciniate at base, the upper floral bracts often perfoliate; calyx as in No. 6, but not so strongly deflexed in fruit; corolla 2-4 cm. long, spotted on the lower lip. (*M. luteus*). Very variable, flowering from spring on moist, rocky coastal bluffs, to late summer in wet meadows. V. I. eastward to the Cypress Hills; Alaska. Very common west of the Cascades, when the stems are sometimes 1.8 cm. thick, and 9 dm. high. (*M. hirsutus* Howell. *M. grandiflorus* Howell). Var. *minima*. Glabrous, stems 6-10 cm. high, corolla with one very large, light brown-purple spot on the lower lip. Paisley Island. Var. *depauperatus* Gray. Usually less than 1 dm. high, very slender, glabrous or puberulent; flowering calyx narrower, with very slender pedicels, which sometimes at least, strongly recurve under the fruiting calyx; corolla 1-2 cm. long. Mt. Cheam; Yale.

5. *M. alpinus* (Gray) Piper. Puberulent or glabrous, about 1 dm. high, usually in masses, stems terete or flattish, decumbent at base, sometimes producing stolons; perennial, with root-stocks; leaves orbicular to ovate, about 1 cm. long, denticulate or entire, often purple beneath; flowers 1-3, often solitary; corolla spotted with dark-red on the lower lip, about 2.5 cm. long, calyx broadly campanulate, the short lobes obtuse or mucronulate. Alpine meadows and streams. Near this is *M. cæspitosus* Greene. Rooting at the lower nodes; lower leaves usually sublyrate; flowers axillary. Selkirk.

6. *M. nasutus* Greene. Usually puberulent, stems square, stout or slender, 1-4 dm. high, branching from the base, annual, germinating in autumn and flowering in early spring; leaves sometimes purple-spotted, or purple beneath, irregularly dentate, usually lacinate at base, and sometimes lyrate, either pinnately or palmately veined, the upper often perfoliate; calyx usually purple-spotted, mostly deflexed in fruit, the upper lobe prominent, the lower becoming inflexed, corolla 12-20 mm. long, often not twice as long as the calyx, the lower lip with scarlet or purple-brown spots. Moist, rocky places, V. I.; South Slokan. Often regarded as a var. of No. 4.

7. *M. alsinoides* Dougl. Annual, the whole plant often purplish, glabrous or puberulent above, very slender, branching from the base, 0.5-2.5 dm. high, erect or ascending; leaves thin or firm, ovate to oblong, palmately veined, denticulate, some of them broad-petioled, often purple beneath; peduncles filiform, 1.5-3 cm. long, exceeding the leaves; calyx 4-9 mm. long, slightly contracted at apex, the teeth short, the lower larger; corolla yellow, twice the calyx, crimson-spotted or brown-purple-spotted on the lower lip, the upper lip with 2 purple lines. Wet banks, V. I., along the Coast and in the Coast Mts.

8. *M. peduncularis* Dougl. Similar; erect, slender, 1-3 dm. high; viscid-puberulent or pubescent, leaves dentate, corolla 10-20 mm. long, calyx 7-8 mm. long, truncate at the wide apex; peduncles 1-2 cm. long, capsule oblongate. East of the Cascades; Armstrong.

9. *M. floribundus* Dougl. Villous, with spreading white hairs or nearly glabrous; slender, at first erect but soon decumbent and diffusely spreading; blades 12-25 mm. long, rather coarsely toothed, petioled, peduncles exceeding the leaves; calyx about 6 mm. long, truncate at apex, corolla about 12 mm. long, funnel-form; capsule globose-ovoid. East of Cascades. Lytton; Princeton.

14. DIGITALIS (FOXGLOVE)

Tall herbs, with large, alternate leaves, and a showy terminal spike of large flowers; calyx 5-parted, the limb of the corolla scarcely spreading, stigma 2-lobed, a little exceeding the didynamous, included stamens. (*L. digitalis*, belonging to the finger; the corolla resembling the finger of a glove).

1. *D. purpurea* L. Pubescent, 0.5-2 m. high; leaves ovate-lanceolate, dentate; corolla 4-5 cm. long, purple and spotted or white. Introd., V.I. eastward; common near New Westminster. A form with a very large terminal flower rarely occurs.

15. CASTILLEJA (PAINT-BRUSH)

Herbs (root-parasitic) with alternate entire or lobed leaves, the bracts usually colored at the tip and more showy than the flowers; calyx tubular; corolla irregular, the upper lip (galea) long, entire, the lower short, 3-lobed; stamens didynamous, enclosed in the galea, the outer anther cell attached by the middle, the inner by the upper end; capsule ovoid or oblong, many-seeded; seeds reticulated, with a loose coat. (Castillejo was a Spanish botanist).

- Calyx less deeply cleft above than below; inflorescence yellowish . . . 1. *C. brachyantha*.
 Calyx about equally cleft on both sides.
 Galea shorter than the corolla tube.
 Inflorescence pale or yellow.
 Leaves mostly entire.
 Stem glabrous or weakly hairy below, the bracts cobwebby . . . 2. *C. pallida*.
 Stem and bracts puberulent . . . 3. *C. sulphurea*.
 Leaves mostly lobed.
 Stems glabrous below, leaves with 3 lance-triangular lobes . . . 12. *C. oreophila*.
 Stems pubescent below.
 Leaves broad, lobes apical, lower lip hardly $\frac{1}{3}$ as long as the galea . . . 5. *C. levisecta*.
 Leaves narrow, lobes lateral, lower lip $\frac{1}{4}$ - $\frac{2}{3}$ as long as the galea.
 Pubescence short, scabrous on leaves . . . 4. *C. lutescens*.
 Pubescence villous, soft throughout . . . 6. *C. camporum*.
 Inflorescence red or purplish.
 Plants 1 m. high, corolla 4-5 cm. long . . . 7. *C. magna*.
 Plants and corollas smaller.
 Leaves entire, or only the uppermost lobed.
 Leaves lanceolate or broader.
 Stems in clumps, the uppermost leaves sometimes lobed . . . 9. *C. rhexifolia*.
 Stems solitary, leaves entire . . . 8. *C. lanceifolia*.
 Leaves linear or narrowly lanceolate . . . 10. *C. purpurascens*.
 Leaves lobed except the lowest.
 Stem pubescent . . . 11. *C. angustifolia*.
 Stem glabrous below . . . 12. *C. oreophila*.
 Galea equaling the corolla-tube or longer.
 Leaves entire or only the uppermost lobed.
 Stems more or less villous; the upper leaves usually lobed; inflorescence reddish-purple . . . 13. *C. Suksdorfii*.
 Stems glabrate or glabrous; leaves entire; inflorescence red . . . 14. *C. miniata*.
 Leaves lobed except the lowest.
 Galea equaling or slightly longer than the tube . . . 11. *C. angustifolia*.
 Galea much longer than the tube . . . 15. *C. rupicola*.

1. *C. brachyantha* Rydb. Pubescent, 1-2 dm. high, lower leaves often entire; the upper 3-5-parted, 2-4 cm. long; bracts of the dense spike broader; lobes of the calyx lanceolate; corolla scarcely exserted, about 2 cm. long, lip with somewhat callous or saccate keels, about the length of the oblong-obtuse lobes. (*C. breviflora* Gray, not DC.) Kamloops; Lower Arrow Lake.

2. *C. pallida* Kunth. Stem ascending, cobwebby or glabrous, about 3 dm. high; leaves linear-lanceolate, 3-4 cm. long, mostly entire; bracts white or yellow, sometimes reddish, 3-lobed at apex; corolla 15-25 mm. long, galea not much exceeding the calyx, the lower lip $\frac{1}{3}$ - $\frac{1}{2}$ as long. Selkirks and Rockies; Queen Charlotte Is.

3. *C. sulphurea* Rydb. Stem puberulent or slightly villous above; leaves linear-lanceolate or lanceolate, 4-5 cm. long, puberulent; bracts entire or usually with 2 lobes above the middle, puberulent, yellow, corolla 2-2.5 cm. long, greenish, or tinged with red; galea exceeding the calyx, the lower lip about $\frac{1}{3}$ as long. Rockies; Emerald Lake; southward.

4. *C. lutescens* (Greenman) Rydb. Stems several, 3-5 dm. high, usually simple, closely short-pubescent; leaves rough to the touch, mostly 3-lobed, the lobes linear-erect, bracts pale-yellow, 3-lobed from below the middle, the middle lobe often again lobed, the lobes spreading-ascending; corolla 15-25 mm. long, but little longer than the calyx; the lower lip $\frac{1}{2}$ - $\frac{2}{3}$ as long as the acute galea. Okanagan to Rockies.

5. *C. levisecta* Greenman. Pilose throughout, especially the inflorescence, 1.5-5 dm. high; leaves oblong-obovate, with 5-7 short, erect lobes at the apex, bracts and calyx yellow; corolla 2-2.5 cm. long; galea about 3 times as long as the lip, and $\frac{1}{2}$ as long as the tube, inflorescence densely villous. Open places, Victoria.

6. *C. camporum* (Greenman) Howell. Stems several, 2-3 dm. high; plant more or less villous; arachnoid, and sometimes glandular; leaves mostly 3-lobed, narrowly oblong, the middle lobe sometimes again lobed; bracts

3-lobed at apex, the middle lobe rounded, yellow, sometimes reddish; the lobes of the calyx short, rounded; corolla 20-25 mm. long, the galea little exerted, the lip $\frac{2}{3}$ as long. Crow's Nest Pass.

7. *C. magna* Rydb. Stem glabrous and shining; leaves lanceolate, entire, 4-6 cm. long, glabrous; inflorescence short and dense, bracts ovate, entire, tipped crimson; calyx 2-5 cm. long, the lobes lanceolate, acuminate, 4-5 mm. long; corolla greenish, tinged with crimson; galea 2 cm. long. Trail.

8. *C. lanceifolia* Rydb. Stems simple or branching, solitary or few, 4-6 dm. high, stem sparingly villous above, glabrous below, leaves lanceolate, entire, often acuminate, 3-5 cm. long, rather firm, inflorescence bright-scarlet, corolla about 3 cm. long, lower lip small, galea 12 mm. long. Mt. Cheam; Dewdney Trail; Rossland; Alt. 3,000-7,000 feet.

9. *C. rhexifolia* Rydb. Stems in clumps, about 4 dm. high, glabrous below, more or less villous above, leaves oblong-lanceolate to ovate, the upper often 3-5 cleft, inflorescence bright red, or flesh colored, corolla 2.5-3.2 cm. long, galea about $\frac{1}{2}$ as long as the tube, the lower lip less than $\frac{1}{3}$ as long as the galea. Chilliwack Mts.; Rockies; Selkirk.

10. *C. purpurascens* Greenm. Tufted, 1-4 dm. high, stem and leaves more or less purplish, glabrous or nearly so to the inflorescence; leaves linear to narrowly lanceolate, often 3-cleft above; bracts usually entire, purple-red to scarlet, rarely yellowish; corolla 2.3-3 cm. long, the galea well exerted, much shorter than the tube, the lip short. Field; Golden.

11. *C. angustifolia* Nutt. Stems clustered, 1-3 dm. high, densely pilose, narrow, hispid-pubescent, spreading, leaves from the middle upward cleft on their upper half into 3-5 linear-lanceolate divaricate lobes; inflorescence red, reddish-yellow or rarely yellow; corolla 2.5-3.5 cm. long, the galea nearly equaling, or slightly longer than, the tube, lip very short; variable. Our common forms are var. *Bradburyi* Fernald. Stems sparingly pilose, leaves broad, rather soft-pubescent, ascending, galea shorter than the tube. Victoria; Yale. Var. *hispida* (Benth.) Fernald. Stems 4-5 dm. high, stem densely pilose, leaves rather harshly pubescent, ascending, galea usually longer than the tube. Rockies; Boundary Bay.

12. *C. oreophila* Greenman. Stem glabrous on its lower half, pilose above, 2-4 dm. high, leaves rather broad, entire near the base of the stem, with 3 lanceolate, ascending or spreading lobes above; inflorescence 4-12 cm. long, usually deep rose-purple, sometimes pale; corolla 1.7-2.5 cm. long, the galea almost half as long as the tube. Mt. Cheam.

13. *C. Suksdorfii* Gray. Similar to *C. lanceifolia*; the upper leaves often cleft; inflorescence red to pale purple, galea nearly equaling the tube. Chilliwack Mts.

14. *C. miniata* Dougl. Glabrous nearly to the inflorescence, stems tufted, usually simple, 3-6 dm. high, leaves lanceolate, or the upper broader; bracts usually entire; corolla usually red, 2.5-3 cm. long, the lower lip small, protuberant, with ovate, involute teeth; calyx-lobes acute. Very common V. I. to Rockies; Alaska. Plants evidently belonging to this species, growing in exposed situations on islands near Metlakatla, have thick, brittle leaves, and galea barely equaling tube of the often pale corolla.

15. *C. rupicola* Piper. Stems tufted, villous, sparingly so or glabrous below, 1-2 dm. high, leaves puberulent, often purplish, 2-3.5 cm. long, deeply cleft into 3-7 linear, spreading lobes; inflorescence scarlet, flowers 8 or fewer; corolla 2.5-3.5 cm. long, the lower lip small, included, anthers white, exerted. Cliffs, Mt. Cheam.

16. ORTHOCARPUS (LESSER PAINT-BRUSH)

Annual or perennial plants, usually smaller than in *Castilleia*, from which it principally differs in the more developed, often 3-saccate, lower lip of the corolla, which is not much shorter than the upper; anther cells, solitary or 2, one attached by the middle, and the other by the tip; seeds reticulate. (Greek *orthos*, upright, *karpos*, fruit).

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|--|-------------------------------|
| Corolla 3-4 mm. long, dark brown above | 1. <i>O. pusillus</i> . |
| Corolla longer, not at all dark brown. | |
| Galea more or less hooked or inflexed at apex. | |
| Corolla yellow | 2. <i>O. luteus</i> . |
| Corolla rose or purplish. | |
| Leaves 3-lobed, lobes of bracts acute | 3. <i>O. bracteosus</i> . |
| Leaves mostly 5-lobed, middle lobe of bracts obtuse | 4. <i>O. tenuifolius</i> . |
| Galea straight. | |
| Stems glabrous at least below; leaves many-lobed, corolla usually purple-tinged at apex. | |
| Calyx-lobes equaling the tube | 5. <i>O. castilleoides</i> . |
| Calyx-lobes much shorter than the tube | 6. <i>O. faucibarbatius</i> . |
| Stems pubescent; leaves usually 3-lobed; corolla pale or slightly purplish. | |
| Bracts usually 3-lobed, cleft nearly to base; lip of corolla spotted with purple | 7. <i>O. attenuatus</i> . |
| Bracts 3-7-lobed, not so deeply cleft; lip of corolla not spotted | 8. <i>O. hispidus</i> . |

1. *O. pusillus* Benth. Puberulent, slender, less than 1 dm. high; foliage usually brownish, leaves pinnatifid, the lobes filiform; bracts pinnatifid with about 3 pairs of filiform segments; corolla brown with yellowish tube, galea somewhat curved over the lip; anthers 1-celled; capsule 5 mm. long, subglobose; seeds dark-brown. Sandy soil, Vancouver; V. I.

2. *O. bracteosus* Benth. Stems soft-pubescent, 1.5-4 dm. high; leaves scabrous-pubescent, broadest at the middle, where they fork into long-attenuate lobes; bracts broad, 3-lobed; corolla 12-15 mm. long, 5-6 mm. broad, pubescent, the galea hooked at the tip, the lower lip much dilated, 3-saccate; capsule ovoid; seeds dark-brown. Oak Bay, Victoria.

3. *O. luteus* Nutt. Stem pubescent, simple or branching above, 1.5-2.5 dm. high; leaves scabrous, linear-lanceolate, entire or 3-cleft, attenuate; bracts broad, 3-lobed, often exceeding the flowers; corolla about 1 cm. long, 3-4 mm. broad, pubescent, galea obtuse, slightly hooked; lower lip 3-saccate; calyx lobes much shorter than the tube. Chilcoten; common on the plains of Alberta.

4. *O. attenuatus* Gray. Stem pubescent to the base, 1-2.5 dm. high, simple or branching throughout; leaves short-pubescent with 3-5 filiform lobes; lobes of the bracts and of the calyx white-tipped; corolla pubescent, 1 cm. long, about 3 mm. broad, whitish or tinged with purple above, the undilated lower lip spotted with purple; capsule ovoid, the seeds enclosed in a whitish, loose network. Victoria.

5. *O. faucibarbatius* (—). Simple or branching, glabrous below, somewhat short-hispid above, 1-2 dm. high; leaves 5-8-lobed, the lobes linear; bracts broader, laciniately lobed, herbaceous or slightly white tipped, shorter than the corolla; spikes dense; calyx 8-9 mm. long, its lobes much shorter than the tube; corolla pubescent, 13-15 mm. long, the tube whitish, the lower lip 3-saccate, slightly dilated, becoming purple, galea straight, slightly pubescent; capsule ovoid, acute, 8-10 mm. long; seeds dark-brown, glabrous or black hairy. Grassy places, Victoria. Probably a new species allied to *O. faucibarbatius*.

6. *O. castilleoides* Benth. Minutely pubescent or glabrous below, 1-3 dm. high, simple or branching, leaves laciniately lobed; bracts large, herbaceous or whitish-tipped, spike dense; calyx 15 mm. long, the lobes as long as the tube; corolla 2 cm. long, corolla dull white or purplish-tipped, galea straight pubescent, the lower lip dilated, tipped with 3-purple lobes; capsule oblong, 1 cm. long, obtuse or emarginate, seeds dark-brown. Wet meadows; Alberni Canal. (?)

7. *O. tenuifolius* Benth. Pubescent and more or less hispid, 1-2 dm. high, simple or branched; leaves with 3-5 filiform lobes; bracts with 1-2 pairs of divaricate lobes, usually red- or purple-tinged; corolla 12 mm. long, puberulent, purplish, the galea inflexed at apex. Dry ground, Osoyoos.

8. *O. hispidus* Benth. Apparently annual, stems simple or branching; about 1 dm. high, pubescent to base; the broad, green or faintly whitish-tipped bracts with 3-7 hispid-hirsute, erect or ascending linear lobes; leaves with 3-5 rather erect short-linear, oblong, obtusish lobes; corolla 3-4 mm. wide, 12 mm. long, whitish or creamy, pubescent, filaments glabrous; galea obtuse the lower lip saccate but not inflated, nearly equaling the galea; calyx-lobes acute, a little longer than the tube; capsule ovoid, seeds yellowish. Grassy places, Victoria.

17. MELAMPYRUM (COW WHEAT)

Erect, branching annuals, the lower leaves entire, the upper usually spinulose, toothed at the base; calyx-teeth lanceolate, half as long as the capsule; corolla somewhat funnel-form, the upper lip compressed, the lower spreading 3-toothed; stamens 4, didynamous, the anther-cells distinct; capsule flat, loculicidally dehiscent, 2-4 seeded. (Greek, *melas*, black, *pyros*, wheat, in allusion to the color of the seeds of some species).

1. *M. lineare* Lam. Puberulent, slender, 2-3 dm. high, leaves lanceolate to linear, the floral the broadest; corolla whitish, the lower lip yellow; capsule spreading or reflexed in fruit. Dry woods, V. I.; Kootenay.

19. RHINANTHUS (YELLOW RATTLE)

Erect, mostly branching, leaves opposite, flowers axillary, yellow; calyx compressed, 4-toothed, much inflated in fruit, membranous corolla 2-lipped, the upper compressed, minutely 2-toothed below the entire apex; stamens 4, anthers hairy, the cells distinct; capsule flat, loculicidally dehiscent. (Greek *rhis*, a snout, *anthos*, a flower).

1. *R. crista-galli* L. Stems 1-6 dm. high, marked above with short black lines; leaves oblong-lanceolate, crenate-dentate; bracts ovate, acuminate, sharply serrate; the teeth of the upper lip violet, the lower with 2 black spots. Prairies of the Rockies; Hazelton; casual about towns.

19. EUPHRASIA (EYEBRIGHT)

Low herbs with opposite leaves and small flowers in spikes; calyx tubular, 4-cleft; upper lip of the corolla erect, scarcely arched, 2-lobed, the lower spreading, 3-cleft, the lobes obtuse or notched; stamens didynamous, anther-cells pointed at base; capsule flattened.

1. *E. arctica* Lange. Simple or branched, 4-12 cm. high; leaves pubescent on both sides, the cauline ovate or obovate, toothed; corolla lilac or whitish-purple, 5-7 mm. long, capsule oblong. Alaska and Rockies northward. (*E. latifolia* Pursh.)

20. PEDICULARIS (LOUSEWORT)

Perennial herbs with alternate or rarely opposite, simple, pinnatifid or pinnate leaves; the flowers in close or loose terminal spikes or racemes; the upper lip beaked, or concave, the lower 3-lobed, crested above, the lateral lobes longest, calyx cleft on the lower, and sometimes on the upper side, 2-5 toothed, capsule obliquely beaked. (L. *pediculus*, a louse, application not obvious).

Galea beaked.

Beak long, curving upwards 1. *P. groenlandica*.

Beak incurved.

Leaves crenate 2. *P. racemosa*.

Leaves pinnately parted 3. *P. contorta*.

Beak straight and short 4. *P. scopulorum*.

Galea curved, but not beaked.

Leaves pinnatifid, at least below.

Pubescent, the upper leaves crenulate 5. *P. euphrasioides*.

Glabrous, all the leaves pinnatifid 6. *P. parviflora*.

Leaves pinnate at least at the base of the rachis 7. *P. bracteosa*.

1. *P. grœnlandica* Retz. (LITTLE ELEPHANT). Glabrous, 3-5 dm. high, the whole plant often red; leaves lanceolate, deeply pinnatifid, with narrow segments, the lower slender-petioled; spikes dense, 3-6 cm. long; calyx with 5 short teeth; corolla red or purple, the tube short, the galea forming a beak 12-15 mm. long. (*Elephantella* Rydb.) Wet places in the mts. throughout B. C.

2. *P. racemosa* Hook. Glabrous, the stems in clusters, 2-4 dm. high; leaves lanceolate, undivided, crenate; flowers in open leafy racemes; calyx-lobes 2, triangular, corolla yellowish-white, galea very strongly incurved, the lower lip large. Common on dry slopes on all the mts.; Mt. Mark, V. I.

3. *P. contorta* Benth. Glabrous, 2-3 dm. high; leaves very deeply divided into narrow serrate lobes; inflorescence about 1 dm. long, the bracts lobed; calyx transversely wrinkled, somewhat inflated above; its 2 lobes toothed; corolla yellow and purple, the lower lobes broad, enclosing the incurving beak. Rockies; Lake Louise; Kootenay Lake.

4. *P. scopulorum* Gray. Low, alpine, 1-2 dm. high, glabrous except the inflorescence, leaves pinnately parted; calyx villous, the lobes triangular-subulate, much shorter than the tube; inflorescence a dense spike with dissected bracts, corolla purple, the galea produced into a short, straight, conical beak, without teeth. Devil's Lake; Rockies.

5. *P. Euphrasioides* Steph. Pubescent, branching, 1.5-3 dm. high; the lower leaves pinnatifid, the upper merely crenate; flowers in a short terminal spike or solitary in the upper axils; corolla yellow or the galea purplish, about 12 mm. long, calyx with 2-3 short teeth, $\frac{2}{3}$ as long as the corolla-tube; capsule shorter than the calyx. Labrador to Alaska; southward in the northern mts.

6. *P. parviflora* Smith. Glabrous or the petioles ciliate, 3-6 dm. high; leaves sometimes opposite, pinnatifid throughout; flowers in loose spikes or solitary in the axils, corolla 15 mm. long, its tube twice as long as the calyx; calyx 2-cleft, the lobes serrate, the capsule twice as long. Labrador to Alaska southward to Oregon; a sea-shore plant.

7. *P. bracteosa* Benth. Glabrous except the inflorescence, 3-8 dm. high, leaves pinnate, divisions pinnatifid; bracts ovate, acuminate, spike dense, about 1 dm. long; calyx-teeth subulate, much longer than the tube; corolla yellow, or the tube purplish, the tube long and narrow, exceeding the tips of the calyx-teeth. There are 2 forms, (a) calyx-lobes oblong lanceolate, rather short. Mt. Cheam, Mt. Rainier (Wash.) (b) calyx-lobes long-acuminate. Rockies; Kootenay.

OROBANCHACEÆ (BROOM-RAPE FAMILY)

Herbs with scaly stems, destitute of green foliage (root parasites), the gamopetalous flowers much as in *Scrophulariaceæ*; stamens 4, didynamous; stigmas 2-lipped; ovary 1-celled with 2-4 parietal placentae.

Glabrous plants; the upper lip of the corolla entire

1. *Boschniakia*.

Glandular-pubescent plants, the upper lip of the corolla 2-lobed

2. *Orobanche*.

1. BOSCHNIAKIA (POQUE)

Stems densely red, scaly or yellow, clustered, with numerous flowers in a dense cone-like spike; stamens about equaling the corolla, the base of the anthers rounded. (Boschniak was a Russian botanist).

1. *B. strobiliacea* Gray. Stems clustered, from tuber-like swellings, 1-2 dm. high, scales ovate to oblong, the upper broadest towards the apex; calyx short, with 2-5 short teeth, a pair of bractlets at the base; corolla 14 mm. long; stigma 3-5-lobed; anthers woolly. Parasitic on the roots of *Salal*. V. I., and West Coast. Eaten by the Indians, who call it Poque.

2. OROBANCHE (BROOM-RAPE)

Brownish, purplish or yellowish plants, with purplish or yellowish flowers; corolla more or less clearly 2-lipped, the upper lip 2-lobed or emarginate, the lower 3-lobed; bases of the anthers mucronate; stigma 2-lipped; placenta 4, distant or in pairs. (*Aphyllon*) (Greek *orobos*, a vetch, *agchore*, straggler).

Flowers sessile or nearly so.

Calyx-lobes longer than the tube	1. <i>O. Ludoviciana</i> .
Calyx-lobes not longer than the tube	2. <i>O. pinorum</i> .
Flowers on peduncles 1-15 cm. long.	
Peduncles bracted	3. <i>O. comosa</i> .
Peduncles naked.	
Calyx-lobes longer than the tube	4. <i>O. uniflora</i> .
Calyx-lobes shorter than the tube	5. <i>O. fasciculata</i> .

1. *O. Ludoviciana* Nutt. Stems usually simple, 1-2 dm. high; flowers purplish, densely spicate, about 16 mm. long, with usually 1 bract at the base of the calyx. Parasitic on *Artemisia* and other composites. Okanagan.

2. *O. pinorum* Gey. Stems branching above, rather slender, from a tuber-like base, 1-2 dm. high; flowers about 12 mm. long, yellowish, in loose spikes, with 2 bracts at the base of the calyx. Parasitic on the roots of conifers. Okanagan.

3. *O. comosa* Hook. Stout, 0.7-2 dm. high, branching from the thick base; flowers many, purplish, 2-2.5 cm. long, on pedicels 1-2 cm. long; calyx-lobes acuminate; anthers woolly. Parasitic on *Grindelia*. Coast, Victoria. Flowering June-July.

4. *O. uniflora* L. (ONE-FLOWERED CANCER-ROOT). Slender, 0.5-2 dm. high; the short, nearly subterranean stem producing 1-4 slender, 1-flowered scapes; corolla curved, violet-tinged (rarely yellow), 15-20 mm. long; calyx-lobes attenuate. Parasitic on grasses, *Peucedanum*, *Ranunculus*, etc. Moist, grassy places, V. I., Kootenay and eastward. Flowering at the coast in April.

5. *O. fasciculata* Nutt. Stout, 1-2 dm. high, stem rising 2-8 cm. above the ground, producing few-many stout peduncles; corolla yellowish or purplish, slightly curved, 1.5-2.5 cm. long; calyx-lobes triangular. Parasitic on *Artemisia*, *Eriogonum* etc. Dry soil, Savary Island; Spence's Bridge; Okanagan and eastward.

LENTIBULARIACEÆ

Small herbs growing in water, or in wet places; calyx 2-lipped; corolla 2-lipped, spurred, with a bearded palate; stamens 2, with 1-celled anthers; ovary 1-celled, placenta free, central; style short or none.

Corolla yellow, leaves finely dissected	1. <i>Utricularia</i> .
Corolla violet, leaves entire	2. <i>Pinguicula</i> .

1. UTRICULARIA (BLADDERWORT)

Aquatic, leaves immersed (sometimes none) bearing little bladders, which, furnished with a valvular lid, entrap small crustacea and other aquatic animals. (Latin *utriculus*, a little bladder).

Leaf segments filiform.

Corolla 12-18 mm. wide, bladders many	1. <i>U. vulgaris</i> .
Corolla 4-8 mm. wide, bladders few.	
Spur of the corolla short, obtuse	2. <i>U. minor</i> .
Spur of the corolla 4 mm. long, acute	3. <i>U. occidentalis</i> .
Leaf segments flat, finely bristle-toothed	4. <i>U. intermedia</i> .

1. *U. vulgaris* L. Leaves crowded, 2-3-pinnate, more than 1 cm. long, the bladders 2-3 mm. long; spur conical, acute, rather shorter than the lower lip; pedicels recurved in fruit. Streams and lakes throughout temperate North America.

2. *U. minor* L. Stems slender; leaves scattered, 2-4 times forked, less than 1 cm. long; bladders 1-2 mm. long; scapes 1-10-flowered; spur short and blunt, pedicels recurved in fruit. Same range.

3. *U. occidentalis* Gray. Similar; stems filiform, leaves repeatedly forking into short segments; scapes 1-5 flowered, the upper lip a little longer than the rounded palate; spur broadly conical. Ucluelet. V. I. to Wn.

4. *U. intermedia* Hayne. Leaves 4-5 times forked, rigid; bladders borne on separate leafless branches; corolla 10-15 mm. broad; the acute spur appressed to, and nearly as long as, the lower lip; pedicels erect in fruit. Kootenay; Ucluelet; Alaska.

2. PINGUICULA (BUTTERWORT)

Stemless perennials with 1-flowered scapes and thick, slimy leaves, to which insects adhere; upper lip of calyx 3-cleft, the lower 2-cleft. (Latin, *pinguis*, fat, in allusion to the greasy leaves).

1. *P. vulgaris* L. Leaves elliptical or spatulate; flowers blue, 2.5 cm. long, the 2 short curved stamens on the lower lip. Wet ground, mts.; V. I.; "The Lions," Vancouver; Glacier; etc.

PLANTAGINACEÆ (PLANTAIN FAMILY)

Stemless herbs with 4-merous flowers in dense cylindrical spikes; stamens 4 (or 2) inserted on the tube of the dry membranaceous gamopetalous corolla, alternate with its lobes; ovary superior, style simple.

1. PLANTAGO (PLANTAIN)

Low plants with naked scapes and strongly ribbed or fleshy leaves; corolla rotate, persistent; stamens much exserted; pod usually 2-celled, opening transversely. (The Latin name).

Leaves ovate or elliptical	1. <i>P. major</i> .
Leaves lanceolate.	
Scapes not woolly, grooved	2. <i>P. lanceolata</i> .
Scapes woolly above	3. <i>P. macrocarpa</i> .
Leaves linear.	
Bracts aristate, conspicuous, 2 or 3 times longer than the calyx	7. <i>P. aristata</i> .
Bracts not longer than the calyx.	
Leaves glabrous.	
Tall and stout, usually 2-4 dm. high	4. <i>P. maritima</i> .
Low, 4-8 cm. high, slender	5. <i>P. Bigelovii</i> .
Leaves tomentose	6. <i>P. Purshii</i> .

1. *P. major* L. (COMMON P.) Glabrous or pubescent, leaves thick, broadly elliptical to cordate-ovate, undulate or toothed, with broad petioles; scapes 1.5-6 dm. high, mostly ascending at the base; spikes dense; capsule ovoid, circumscissile a little below the middle; 8-18-seeded, seeds reticulated. Very common, gardens and roadsides. Var. *Asiatica* (L.) Dcne. Leaves often erect, mostly smooth, spike tapering at apex; capsule circumscissile well below the middle. A large, indigenous form in moist ground along the coast; Kootenay. Var. *minima* Dcne. A small, hairy, form near the sea, Victoria; Nanaimo.

2. *P. lanceolata* L. (RIB GRASS). Pubescent; scape much exceeding the 3-5 nerved leaves; 2-6 dm. high; spike cylindrical, 1-8 cm. long, (or at first conical, sometimes compound) the 2 lower sepals often united; bracts scarious, short-acuminate; sepals scarious-margined with a green midrib; pods 4-5 mm. long, oblong, circumscissile below the middle; seeds 2, strongly hollowed on the face. Introd.; common, fields and roadsides.

3. *P. macrocarpa* C. & S. Scapes equaling or exceeding the leaves; leaves 5-7-nerved, some of the outer often with linear blades, narrower than the dilated petioles; spikes 5-9 cm. long, bracts fleshy-herbaceous and scarious-

marginated; capsule ovoid-oblong, 6-8 mm. long, seeds 2, hollowed on one side, roughish. Seashore; North West Coast to Alaska; Alberni.

4. *P. maritima* L. Perennial, leaves linear, fleshy, 0.5-3 dm. long, scape pubescent, the pubescence densely brown below the spike, 1-5 dm. high; spike dense or loose, 5-12 cm. long; sepals green; corolla with spreading lobes; capsule ovoid-oblong, 2-3 seeded, circumscissile below the middle; seeds brown, smoothish; a deep pit on one side. Salt marshes and beaches; Alaska to Cal.

5. *P. Bigelovii* Gray. Annual, leaves linear, 2-6 cm. long, scapes 2-8 cm. long, pubescent with short, appressed, white hairs; sepals with broad, scarious margins; stamens 2, spike about 1 cm. long; capsule usually purple; seeds 4, oblong, dark brown, more or less pitted over the whole surface, and with a large, oblong pit on one side. Rocky bluffs near the sea, Victoria.

6. *P. Purshii* R. & S. White-woolly, 1-2 dm. high; the dense spike sometimes equaling the scape; stamens of 2 sorts in different plants, with short or long filaments; bracts linear-subulate, not longer than the flowers; stamens 4, just exerted; capsule oval, 4 mm. long, circumscissile at the middle; seeds 2, brown, finely pitted. Dry plains, Spence's Bridge, eastward to the plains of the North West.

7. *P. aristata* Michx. Similar, but dark green; glabrous or villous bracts aristate to foliaceous, many times longer than the flower; capsule oblong, 3-5 mm. long, seeds 2. Alberta to Wn.; Kootenay(?).

RUBIACEÆ (MADDER FAMILY)

Herbs with opposite or whorled, entire leaves; calyx adherent to the 2-4-celled ovary; stamens 4 or 5, as many as the lobes of the regular corolla and inserted on its tube; fruit, in ours, twin, of 2 indehiscent, 1-seeded carpels.

GALIUM (BEDSTRAW. CLEAVERS)

Slender herbs with square stems and whorled leaves, the roots often containing red-coloring matter; flowers cymose, small; corolla rotate; stamens usually 4; styles 2; fruit twin, separating at maturity into 2 globose carpels. (Greek *gala*, milk, which some species were used to curdle).

Fruit smooth.

- | | |
|--------------------------------------|-------------------------|
| Flowers in large panicles | 1. <i>G. boreale</i> . |
| Flowers in small cymes | 3. <i>G. cymosum</i> . |
| Flowers solitary or in 3's | 2. <i>G. trifidum</i> . |

Fruit hispid.

- | | |
|---|------------------------------|
| Flowers in terminal panicles, leaves 3-veined | 1. <i>G. boreale</i> . |
| Flowers solitary or in 3's, leaves 1-veined, except in No. 7. | |
| Leaves on main stem mostly in 6's or 8's. | |
| Perennial, leaves 1-2.5 cm. long | 4. <i>G. triflorum</i> . |
| Annual, leaves 3-7 cm. long | 5. <i>G. aparine</i> . |
| Leaves on main stem mostly in 4's. | |
| Fruit minutely hispid | 6. <i>G. bifolium</i> . |
| Fruit very densely white-hispid | 7. <i>G. kamtschaticum</i> . |

1. *G. boreale* L. Perennial, stems erect, 1-4 dm. high, smoothish, branching; leaves in 4's, 3-nerved, hispid, linear and sometimes revolute to lanceolate; flowers white, the petals large for the genus; fruit in coast specimens apt to be glabrous, in species from the interior often remaining hispid. V. I. to the Rockies in rather dry soil, or on rocky, lake-shores; Alaska.

2. *G. trifidum* L. Perennial, stems very slender, rough, usually matted, 1-5 dm. high; leaves of main stem mostly in 4's, linear-spatulate to oblong, obtuse, 1-nerved, 1.3 cm. long, or less, rough on margins and midrib; petals less than 1 mm. long, whitish or pinkish, flowers often 3-merous, pedicels curving under the small fruit; fruit 1-1.3 mm. broad. Atlantic to Pacific, in wet places. Var. *subbiflorum* Wieg. Stems less glabrous than in

the species, somewhat shorter, leaves longer, and often very unequal, nearly smooth, pedicels usually 1-flowered. V. I.; Lower Fraser, eastward.

3. *G. cymosum* Wieg. Perennial, stem roughish or smooth, rather stouter than in the preceding, clambering, leaves of main stem in 4's, 5's, or 6's, narrowly oblanceolate, acutish or obtuse and roughish, reaching 1.8 cm. in length, flowers in small cymes, at the ends of the branches; fruit small, on short, smooth, curving pedicels. South Westminster; Wn.

4. *G. triflorum* Michx. (SWEET-SCENTED B.) Perennial; stems 3-12 dm. long, smooth or slightly rough; leaves 3-10 mm. broad, 1-3 cm. long, bristle-tipped, slightly rough, acute or rarely obtuse; peduncles long and straight, 3-flowered, petals greenish; fruit covered with reddish, blackish or white, hooked bristles. Very fragrant in drying. Common, Alaska to Cal.

5. *G. aparine* L. (CLEAVERS). Annual; stems stoutish, reclining, slightly hairy at the nodes; leaves very rough, especially towards the base, usually less than 6 mm. broad, reaching 7 cm. in length, almost petiolate; peduncles long and straight, 3-flowered; petals whitish; fruit 3-4.5 mm. in diameter, covered with whitish, hooked bristles. Common, Alaska to Cal. Var. *Vaillantii* (DC.) Koch. Smaller, stems rather erect; leaves less than 2.5 cm. long; fruit smaller, 1.5-3 mm. in diameter. East of the Cascades.

6. *G. bifolium* Wats. Annual; smooth and glabrous; stems slender, 1-3 dm. high, mostly erect, leaves 2-4 in a whorl (if 4 the alternate pair smaller) 8-15 mm. long, lanceolate; peduncles 1-flowered; corolla small, white; fruit small, minutely hispid. Dewdney Trail; mts., Wn.

7. *G. kamschaticum* Stell. Perennial; stems erect, mainly glabrous, 2-5 dm. high, lanceolate, bluntly pointed, 1-5 cm. long, rough-ciliate on margins and midrib; flowers terminal, in 3's, corolla greenish-white. Alaska to Wn.; Cascades; Hazelton. Var. *oreganum* (Brit.) Piper. Leaves orbicular to obovate, obtuse. Cowichan Lake.

CAPRIFOLIACEÆ (HONEYSUCKLE FAMILY)

Shrubs or sometimes herbs, with opposite leaves, and a 2-5-celled, inferior ovary, which usually develops into a berry; stamens as many as the 4-5-lobed corolla (1 fewer in *Linnaea*, twice as many in *Adoxa*).

Plants herbaceous.

Stems trailing .

Stems erect, the fertile with a pair of leaves 1. *Linnaea*.

Plants shrubby.

Corolla tubular, stigma capitate, style slender.

Corolla irregular, usually glabrous at base, fruit red or black 3. *Lonicera*.

Corolla regular, not gibbous, fruit white 4. *Symphoricarpus*.

Corolla rotate, stigmas sessile or nearly so.

Leaves pinnate 5. *Sambucus*.

Leaves simple 6. *Viburnum*.

1. LINNÆA (TWINFLOWER)

A slender, trailing, evergreen, with short, ascending branches and pinkish, very fragrant flowers in pairs on filiform pedicels; calyx-teeth 2, awl-shaped, deciduous; corolla funnel-form, nearly regular, 5 lobed; stamens 4, 2 shorter; ovary 3-celled, becoming a dry, 1-seeded pod. (The plant was a favorite with Linnæus).

1. *L. borealis* L. var. *Americana* (Forbes.) Rehder. Leaves orbicular or oval, sparingly crenate towards the rounded or acute apex; corolla pinkish or rose-purple, funnel-form with cylindrical base, 10-16 mm. long, hairy within. Common, Alaska to Cal. The predominance of acute or rounded leaves sometimes gives character to patches, but the two forms are not distinct.

2. ADOXA (MOSCHATTEL)

A low, herbaceous perennial with ternately-divided leaves and scaly root-stock; calyx-tube not reaching the summit of the 3-5-celled ovary; corolla rotate, 4-6-cleft, bearing at each sinus a pair of separate or partly united stamens; style 3-5-parted; fruit dry. (Greek *adoxos*, obscure).

1. *A. moschatellina* L. Smooth, musky, the flowering stems with a pair of leaves near the middle, the divisions of which are 3-lobed; flowers several in a terminal cluster on a slender pedicel. Mossy woods, Alaska to Colorado and eastward. Nechacco River; Coast, northw.

3. LONICERA (HONEYSUCKLE)

Erect or climbing shrubs with opposite, entire leaves, and tubular or funnel-form, often gibbous corollas; stamens 5; stigmas capitate; ovary inferior, becoming a berry. (Lonitzer was a German herbalist).

Stems climbing or prostrate, flowers in clusters.

Corolla 2-3 cm. long.	1. <i>L. glaucescens</i> .
Style exserted, hairy	2. <i>L. ciliosa</i> .
Style hardly exserted, smooth	3. <i>L. hispidula</i> .
Corolla less than 2 cm. long	4. <i>L. involucratum</i> .
Stems erect, flowers in pairs.	5. <i>L. canadensis</i> .
Bracts foliaceous, 1 cm. long or more	6. <i>L. cærulea</i> .
Bracts linear or subulate, much smaller.	7. <i>L. utahensis</i> .
Leaves acute, peduncles much longer than the corolla	
Leaves obtuse, peduncles not much longer than the corolla or shorter.	
Ovaries united, fruit blue-black	
Ovaries distinct, fruit red	

1. *L. glaucescens* Rydb. (RED H.) Stems 1 m. long or less and apparently not twining; leaves oblong, pubescent and glaucous beneath, glabrous above, chartaceous-margined; the upper pair usually connate, pointed; flowers yellow, becoming red, the corolla pubescent without, the tube narrow, tubular; stamens and style distinctly exserted. Dry woods, Field.

2. *L. ciliosa* Poir. (ORANGE H.) Stems 1-6 m. long, trailing or twining; leaves elliptical, glaucous beneath, glabrous or ciliate margined, the upper pair connate, obtuse; corolla yellow and scarlet or red, nearly glabrous without, the tube funnel-form, the limb sometimes obsolete; stamens and style little exserted. Dry woods and rocky hillsides, V. I. to the Columbia Valley.

3. *L. hispidula* Lindl. (PURPLE H.) Stems 0.5-2 m. long, trailing or twining, more or less hairy; leaves oblong-ovate, glaucous and pubescent beneath, glabrous above, the upper pairs connate; flowers in 2-6, terminal, verticillate clusters, corolla purplish, strongly bilabiate; stamens and style much-exserted. Rocky hillsides V. I., Gulf Islands; Powell Lake.

4. *L. involucratum* Banks. (BLACK TWIN-BERRY). Erect 1-4 m. high; leaves oblong, elliptical or lanceolate, pubescent beneath, mostly acute or short-pointed; corolla nearly regular, 10-12 mm. long, yellow, strongly gibbous at the base, pubescent; fruit black, loosely enclosed by the dark-red involucre. Common, damp thickets, V. I., eastward to the Atlantic; Alaska.

5. *L. Canadensis* Marsh. (CANADIAN FLY HONEYSUCKLE). Erect, 1-5 m. high; leaves thin, 6 cm. long, ovate-oblong, mostly acute, strongly ciliate, petioles 6 mm. long; corolla nearly 2 cm. long, yellow, nearly regular; bracts subulate; berries separate, red. (*L. ciliata* Muhl.) Dean River and eastw.

6. *L. cærulea* L. (BLUE FLY H.) Low, 3-6 dm. high, leaves oblong-elliptical, obtuse, short-petioled, 2-3 cm. long, pubescent or glabrate; peduncles shorter than the nearly regular corolla, which is yellow, somewhat gibbous at base, and about 1 cm. long, bracts subulate, longer than the ovaries, which are united to form a 2-eyed, blue-black berry. South Kootenay Pass northward to Alaska.

7. *L. utahensis* Wat. (RED TWIN-BERRY). Erect, 1-1.7 m. high, leaves obtuse, 3-4 cm. long, ovate-oblong, glabrous above, pilose beneath, especially towards the base, or quite glabrous, somewhat ciliate; petioles 3-4 mm. long; peduncles a little shorter, or a little longer than the flowers; corolla nearly regular, yellow, 15-18 mm. long, gibbous at base; bracts shorter than the separate ovaries; a small pair of bractlets usually present; fruit separate, red berries. Revelstoke; Golden; Rossland; Mt. Garibaldi.

4. SYMPHORICARPUS (WAX BERRY)

Shrubs with mostly entire leaves and rose-tinged flowers in small clusters; calyx-teeth short; corolla bell-shaped, 4-5-lobed, with as many stamens; ovary 4-celled, 2 seeded. (Greek *symphorein*, to bear together, *karpōs*, fruit; from the clustered berries).

1. *S. racemosa* Michx. Erect, 1-3 m. high; leaves ovate to oblong, often sinuately toothed, pubescent beneath; corolla 5-lobed, bearded within, stamens and style included; fruit a white berry. Common. Var. *pauciflorus* Robbins. Low, some of the stems creeping; petioles and under-surface of leaves pubescent; leaves 2-3 cm. long, smaller and paler beneath, sometimes ovate. Colwood, V. I.; Elgin; Field. Var. *lævigata* Fer. Leaves glabrous beneath, (GARDEN SNOWBERRY). Elgin.

5. SAMBUCUS (ELDER)

Shrubs in clumps, with pinnate leaves, finely serrate leaflets and large cymes of small, whitish flowers; calyx-lobes minute, corolla open, urn-shaped, with a spreading, 5-lobed limb; stamens 5; stigmas 3; fruit a berry. (The Latin name, perhaps from Greek *sambuke*, an ancient musical instrument).

Inflorescence flat-topped, berries black	1. <i>S. glauca</i>
Inflorescence pyramidal.	
Berries scarlet	2. <i>S. racemosa</i> .
Berries black	3. <i>S. melanocarpa</i> .

1. *S. glauca* Nutt. (TREE E.) A shrub or small tree, the larger with trunks 1-2.5 dm. in diameter; glabrous throughout; leaflets 5-9, firm, the lower sometimes divided, oblong, mostly contracted at the apex to a short tip; fruit strongly glaucous. Common, V. I., Chilliwack and eastward to the Arrow Lakes. Flowering in summer.

2. *S. racemosa* L. (RED-FRUITED E.) Shrub 2-5 m. high; leaflets pubescent on the veins beneath, usually glabrous above, mostly more than 1 dm. long, subsessile, serrate, acute or acuminate, somewhat acute or rounded at base, the terminal one acute; inflorescence often longer than wide, petals creamy; nutlets smooth or slightly roughened, more or less angled on one face. Very abundant at the Coast; eastw. to the Atlantic.

3. *S. melanocarpa* Gray. (BLACK-FRUITED E.) Shrub 1-3 m. high; leaves glabrous above, pubescent beneath, mostly less than 1 dm. long, more or less petioled, finely serrate, acuminate, rounded at base; inflorescence often broader than long; petals white; nutlets slightly pitted, hardly angled, oblong. Revelstoke; Fernie.

6. VIBURNUM (ARROW-WOOD)

Shrubs with simple, lobed leaves, and white flowers in flat cymes; calyx 5-toothed; corolla spreading, deeply 5-lobed; stamens 5; stigmas 1-3; fruit a 1-seeded drupe. (The Latin name).

Marginal flowers of cyme neutral, showy	1. <i>V. opulus</i> .
Flowers all similar, small	2. <i>V. pauciflorum</i> .

1. *V. opulus* L. var. *americanum* (Mill) Ait. (HIGH-BUSH CRANBERRY). Glabrous or nearly so, 1-3 m. high; leaves strongly 3-lobed, the lobes acuminate serrate, the sinuses entire; petioles with 2 glands at apex; cyme 4-10 cm.

broad, the outer flowers largest; stamens elongated; fruit red, edible, not so pleasant as that of the next; stone flat, not grooved. Agassiz; Sicamous; Salmon Arm. The snowball of the garden is a form of this species with all the flowers neutral.

2. **V. pauciflorum** Raf. (SQUASHBERRY). Straggling, 1-3 m. high; leaves lightly 3-lobed, irregularly toothed, with 2 glands at the base, more or less pubescent beneath; cyme small, 1-1.5 cm. broad; stamens shorter than the corolla; fruit red, with the flavor of the cranberry; stone scarcely grooved. Valleys near North Vancouver; Fraser Valley; Cowichan Lake; Strathcona Park; abundant northward.

VALERIANACEÆ (VALERIAN FAMILY)

Herbs with opposite, exstipulate leaves, and close cymes of small flowers; calyx-tube adnate to the inferior 1-3-celled ovary, its lobes filiform to nearly obsolete; corolla irregular, tubular or funnel-form, 4-5 lobed, often spurred, stamens 1-4, mostly 3, inserted on its tube; styles filiform, stigmas 2, ovary usually 3-celled, 2 cells empty and often becoming wings, the third containing 1 ovule.

Low herbs; calyx-limb entire, merely toothed or obsolete	1. Valerianella.
Tall herbs; calyx-limb of several plumose bristles, most evident in fruiting	2. Valeriana.

1. VALERIANELLA (CORN SALAD)

Low, glabrous annuals; leaves entire; corolla funnel-form, spurred or spurless, stamens 3 (rarely 2), fruit 1-seeded, 2 of the cells empty.

Corolla not spurred, mostly 4-lobed.	
Corolla blue, fruit not winged	1. <i>V. Locusta</i> .
Corolla white, fruit winged	2. <i>V. anomala</i> .
Corolla spurred, red or pale.	
Corolla pale, fruit wingless, keeled	4. <i>V. samolifolia</i> .
Fruit winged.	
Corolla pale, fruit slightly grooved on the back	5. <i>V. macrocera</i> .
Corolla red, fruit keeled	3. <i>V. congesta</i> .

1. **V. Locusta** (L.) Betche. Dichotomously branching; leaves oblong; corolla nearly regular, inflorescence leafy-bracted; fruit with a corky mass at the back of the fertile cell, flattish, obliquely rhomboidal. Introd., Victoria; Tyee, V. I.

2. **V. anomala** Gray. Flowers small, in verticals, corolla white, 2-3 mm. long, usually 4-lobed; fruit winged, sharply angled on the back. Nanaimo; Wn.

3. **V. congesta** DC. (SEA BLUSH). Stems square, rather stout, 1-5 dm. high; leaves oblong or the lower spatulate; flowers red, capitate or at length verticillate, corolla 4-6 mm. long, the spur slender, half the length of the gibbous tube; fruit densely short-pubescent, the wings involute on the margin. Very common about Victoria; Nanaimo; and on grassy, open bluffs, Gulf of Georgia; Yale.

4. **V. samolifolia** Hæck. Similar; more slender, with smaller and paler, verticillate flower-clusters; leaves spatulate-obovate; corolla 2-3 mm. long, the spur hardly one-third the length of the tube, conic-saccate; fruit wingless, puberulent, 3-angled, resembling a slender buckwheat achene. Shady woods, near Victoria.

5. **V. macrocera** T. & G. Similar to the preceding; more slender than *V. congesta*; corolla pink or pale, the spur nearly as long as the narrow tube; fruit glabrous or puberulent, rounded on the back, short-beaked, wings broad, spreading or incurved. Occuring sparingly with *V. congesta*; also at Lytton.

2. VALERIANA (VALERIAN)

Perennial with strongly scented rootstocks, simple or pinnate leaves, and small, whitish or pinkish flowers in close cymes; the plumose limb of the calyx concealed till the fruit forms; corolla often gibbous, but not spurred; limb 5-lobed, stamens 3, the abortive cells small, not evident in fruit. (The Latin name).

Leaves thick, entire, or the segments not dentate; root fusiform, perpendicular; ovary pubescent.

Leaves thin; rootstocks creeping; ovary glabrous.

1. *V. ceratophylla*.

Basal leaves mostly entire, the segments of the cauline oblong-lanceolate, mostly entire

2. *V. sylvatica*.

Basal leaves mostly in 3-5 segments, the segments of the cauline ovate, dentate

3. *V. sitchensis*.

1. *V. ceratophylla* (Hook.) Piper. Root fusiform, perpendicular; leaves entire, slightly pubescent, the basal spatulate-oblong-lanceolate, entire or lacinate-pinnatifid, the cauline pinnately parted into 3-7 lanceolate segments, flowers polygamo-dioecious, yellowish-white, in a thyrsiform naked panicle. S. E. Kootenay.

2. *V. sylvatica* Banks. More slender than the next; nearly glabrous throughout, except the bases of the petioles; basal leaves petioled, oblong or spatulate, obtuse, entire, or with a few lobes; stem leaves with 3-13 segments, the divisions lanceolate-oblong, mostly entire; fruit ovate, glabrous. Rockies, Crow's Nest Pass.

3. *V. sitchensis* Bong. Stout; radical leaves mostly 3-5 foliate, the terminal segments much the largest, or sometimes round, nearly entire, glabrous except the inflorescence and the short-pubescent nodes; the divisions of the stem leaves 3-5, orbicular to oblong-ovate, dentate-repand; corolla 6 mm. long, tube cylindrical, whitish or pinkish, with a short tube, inflorescence dense, stigma entire, fruit narrowly ovoid, purple spotted. Dry woods and along streams, Alaska southward. V. I., Bowen Is., Coast Mts., Kootenay. Var. *Scouleri* (Rydb.) Piper. Leaf-segments oblong to obovate, entire or nearly so. Duncan, V. I.; Rockies.

CUCURBITACEÆ (GOURD FAMILY)

Vines with tendrils and monoecious or dioecious flowers; calyx-tube adhering to the 1-3 celled ovary; stamens 3-5, more or less united; fruit a pepo; seeds large, without albumen. The cucumber, pumpkin, squash, and melon belong to this family.

1. ECHINOCYSTIS

Flowers monoecious, the staminate flowers in peduncled racemes, the pistillate axillary, usually solitary; stamens 3; ovary prickly, 2-celled; seeds 1-4, subglobose. (*Megarrhiza*).

1. *E. oregana* Cogn. Perennial, stems 3-6 m. long; leaves cordate, 5-7 lobed, 1-1.5 dm. broad, scabrous above, fruit 2.5-4 cm. thick, with fleshy prickles. Indian Rancheries, V. I. *E. lobata*, T. & G. Leaves smaller, fruit covered with slender prickles. Common annual in gardens.

CAMPANULACEÆ (BLUEBELL FAMILY)

Herbs with milky juice; calyx adherent to the 2-several-celled, many-seeded ovary; corolla regular, 5-lobed, blue or white; stamens 5, separate; stigmas 2 or more, often 3; capsule 3-celled, usually opening by lateral pores.

Stem-leaves clasping, orbicular.

Calyx-lobes lanceolate, entire; capsule opening by lateral pores . . . 1. *Specularia*.
Calyx-lobes ovate, foliaceous, toothed; capsule opening irregularly . . . 2. *Heterocodon*.
Stem-leaves not clasping, linear-lanceolate . . . 3. *Campanula*.

1. SPECULARIA (VENUS' LOOKING-GLASS)

Annuals with blue, axillary flowers, the earliest (lowest) cleistogamous; calyx 3-5-lobed; corolla rotate; stigmas 3; capsule oblong or elliptical, opening by 3 small valves about the middle; seeds lenticular.

1. *S. perfoliata* (L.) A. DC. Hairy, 2-5 dm. high; leaves broader than long, crenate-dentate; flowers sessile, 1-3 in the axils, only the upper with a corolla; calyx-lobes slightly scabrous on the margin, those of the cleistogamous half as long as those of the normal flowers. Sandy ground; Goldstream, V. I.; Boundary Bay; Columbia Valley.

2. HETEROCODON

Annual, pubescent, with cleistogamous and normal flowers as in *Specularia*; corolla blue, short-campanulate, capsule obovoid, the thin walls dehiscing irregularly; seeds oblong, obscurely 3-angled. (Greek *heteros*, different, *kodon*, a bell, in allusion to the two forms of flowers).

1. *H. rariflorum* Nutt. Stems slender, 1-3 dm. long, spreading; leaves coarsely dentate; flowers solitary in the axils, the corolla about equaling the large calyx-lobes. Shady places, Victoria; Columbia Valley.

3. CAMPANULA (BLUEBELL)

Slender perennials (ours) with a campanulate blue corolla, and a 5-cleft calyx; stigmas 3, the short capsule opening laterally by 3 valves. (Latin *campanula*, a bell, in allusion to the shape of the corolla).

Style exerted
Style included.

1. *C. Scouleri*.
Capsule opening near the summit, corolla narrow, 8-12 mm. long . . . 2. *C. uniflora*.
Capsule opening near the base, corolla broad, 12-30 mm. long . . . 3. *C. rotundifolia*

1. *C. Scouleri* Hook. Glabrous, 1-2 dm. high; usually simple with a few pale-lavender flowers on filiform, bracteolate pedicels; leaves ovate-lanceolate, serrate, the lower with petioles nearly as long as the blades; corolla-lobes spreading, longer than the tube. Dry woods,* V. I.; and Islands, Gulf of Georgia; Alaska.

2. *C. uniflora* L. Glabrous or nearly so, 3-15 cm. high; leaves rather few, linear-oblong, or the lower spatulate, entire or denticulate; calyx-tube shorter than, or equaling the lobes; flower solitary, the lobes lanceolate; capsule erect. Alpine, Rockies; Alaska.

3. *C. rotundifolia* L. (HAREBELL. BLUEBELL). A slender perennial, usually tufted, 1-5 dm. high; basal leaves round or ovate, mostly toothed, usually disappearing before flowering; lower stem-leaves linear or linear-lanceolate, entire, smooth, rarely scabrous-pubescent, stems typically retrorsely short-pubescent below, but also glabrous; corolla campanulate, sometimes broader than long; calyx-lobes slender, erect, or spreading; capsule nodding. Widely distributed and variable. Var. *dubia* (A. DC.) Corolla funnel-form with an acutish base. Field. Var. *petiotala* (A. DC.) Lower stem leaves lanceolate, serrate. Field. Var. *Alaskana* Gray. Stem more leafy; leaves broader, the lower stem-leaves ovate, the upper lanceolate. Mts., V. I.; Tiell River, Q. C. Is.

4. *C. Aurita* Greene. Low; 2 lobes at base of calyx, and the deeply-lobed corolla, distinguish this from No. 3. Alaska.

5. *C. lasiocarpa* Cham. Distinguished from No. 2 by the laciniately toothed leaves, larger corolla, and laciniately toothed calyx-lobes. Q. C. Is.; Alaska.

LOBELIACEÆ (LOBELIA FAMILY)

Herbs with acrid, milky juice, and alternate leaves; corolla irregular 5-lobed; the 5 stamens inserted with the corolla and united at least by the anthers; ovary inferior, many-seeded; style 1. (l'Obel was a Flemish botanist).

LOBELIA

Flowers bluish, in racemes; calyx 5-cleft; corolla 2-lipped, the upper lip 2-lobed, the lower 3-lobed, the tube divided to the base on one side; 2 of the anthers bearded; pod 2-celled.

Aquatic, leaves terete, all basal	1. <i>L. Dortmanna</i> .
Terrestrial, leaves not terete, and not all basal.	
Leaves linear or spatulate	2. <i>L. Kalmii</i> .
Leaves ovate or oblong	3. <i>L. inflata</i> .

1. *L. Dortmanni* L. (WATER L.) Glabrous aquatic, sometimes producing runners; leaves in a basal tuft, terete, fleshy, hollow with a lengthwise partition; flowers few, light-blue with small bracts, the corolla many times longer than the short calyx. In shallow water, Shawnigan Lake, V. I.

2. *L. Kalmii* L. Glabrous or nearly so, 1-5 dm. high; leaves linear, denticulate or entire; pedicels as long as the flower, minutely 2-bracted or 2-glandular above the middle; corolla light-blue, 1 cm. long; calyx-tube top-shaped, fully half the length of the lobes; pod not inflated. Wet meadows and shores, Donald; Kootenay.

3. *L. inflata* L. (INDIAN TOBACCO). Annual or biennial; stems simple or branching, leafy, 3-5 dm. high, pubescent; basal leaves obovate; stem-leaves oblong, irregularly crenate; flowers in terminal more or less leafy racemes, the purplish-blue corolla hardly exceeding the calyx; pod inflated; a very acrid plant. Not common; Popcum.

COMPOSITÆ (COMPOSITE FAMILY)

Flowers in heads on a common receptacle surrounded by an involucre composed of bracts; stamens 5, inserted on the corolla, their anthers united; ovary inferior; calyx represented by the pappus, which consists of scales, awns, bristles, or sometimes a mere crown, surmounting the ovary; style usually 2-cleft; fruit an achene. The outer flowers of the head are often strap-shaped (ligules or rays), have no stamens and sometimes no pistil; the disk flowers are tubular and usually have both stamens and pistil. When the head contains 2 kinds of flowers, it is said to be *heterogamous*; when of one kind, *monogamous*. On the receptacle bracts (*chaff* or *scales*) often subtend the flowers; when these are wanting the receptacle is said to be *naked*. The Family falls into 2 series:—

Series I. TUBULIFLORÆ. Corolla tubular in all the perfect flowers, ligulate only in the marginal ray-flowers, which when present, are either pistillate only or neutral (with neither stamens nor pistil).

Series II. LIGULIFLORÆ. Corolla ligulate in all the flowers of the heads, and all the flowers perfect; plants with milky juice.

Key to the Tribes of Series I

- Anthers separate or nearly so III. HELIANTHÆ.
 Anthers united into a tube.
 Anthers not caudate at base.
 Heads discoid, flowers all perfect, never yellow I. EUPATORIÆ.
 Heads usually radiate.
 Style-branches of perfect flowers flat, and prolonged above
 the marginal stigmatic lines into a flat appendage II. ASTERÆ.
 Style branches of perfect flowers not flattened; either truncate
 or appendaged.
 Involucre not scarious.
 Pappus not capillary.
 Receptacle chaffy III. HELIANTHÆ.
 Receptacle naked IV. HELENIÆ.
 Pappus capillary VI. SENECTIONIÆ.
 Involucre scarious, pappus not capillary, heads often discoid
 V. ANTHEMIDÆ.
 Anthers caudate at base, style-branches obtuse, not appendaged,
 smooth; heads discoid.
 Receptacle naked, pistillate flowers mostly filiform, involucre
 of scaly bracts VII. INULÆ.
 Receptacle bristly, pistillate flowers not filiform, involucre
 mostly of bristly or hooked bracts VIII. CYNARÆ.

Tribe I. EUPATORIÆ

Heads discoid; flowers all perfect, not yellow; anthers not caudate; style-branches club-shaped, obtuse; pappus capillary; receptacle naked; leaves entire or dentate.

- Achenes 5-angled 1. Eupatorium.
 Achenes 10-ribbed 2. Brickellia.

Tribe II. ASTERÆ

Leaves mostly alternate; heads radiate, rarely rayless; receptacle naked; anthers not caudate; style branches flattened or with a lanceolate, hairy appendage above the marginal stigmatic lines; pappus of bristles, sometimes of awns.

- Pappus wanting or minute 7. Bellis.
 Pappus of scales 3. Grindelia.
 Pappus of bristles.
 Heads discoid.
 Bracts of involucre in about 1 series 5. Erigeron.
 Bracts of involucre in several series 11. Bigelovia.
 Heads radiate.
 Rays yellow.
 Flowers in a solitary head.
 Stem-leaves linear-lanceolate 5. Erigeron.
 Stem-leaves spatulate-oblong 8. Aplopappus.
 Flowers in many heads.
 Pappus more or less double; heads rather large.
 Stem-leaves linear; pappus indistinctly double 5. Erigeron.
 Stem-leaves oblanceolate; pappus distinctly double 6. Chrysopsis.
 Pappus simple, heads small 9. Solidago.
 Rays not yellow.
 Involucral bracts nearly equal, in about a single series 5. Erigeron.
 Involucral bracts unequal, in several series.
 Rays inconspicuous 10. Seriocarpus.
 Rays conspicuous 4. Aster.

Tribe III. HELIANTHÆ

Leaves mostly opposite, at least below; heads radiate, or discoid in *Ambrosiaceæ*; involucre not scarious (nutlike in fruit in *Ambrosia*, *Franseria* and *Xanthium*); receptacle chaffy; pappus never capillary, sometimes wanting; anthers not caudate; style-branches truncate or hairy-appendaged.

- Stamens nearly distinct; flowers unisexual, heads discoid (*Ambrosiaceæ*).
- Involucre not tubercled nor spiny; heads alike 12. Iva.
- Involucre spiny or tubercled; heads of 2 kinds.
- Bracts of staminate involucre united.
- Fertile involucre with a single row of prickles or tubercles near the summit 13. Ambrosia.
- Fertile involucre with more than one row of prickles 14. Franseria.
- Bracts of staminate involucre distinct, fruit a large, very spiny bur 15. Xanthium.
- Stamens united by the anthers, involucre not spiny, at least some of the flowers perfect.
- Heads discoid.
- Pappus none 16. Madia.
- Pappus of barbed awns 26. Bidens.
- Heads radiate.
- Rays white or purplish.
- Involucral bracts enclosing the outer achenes 17. Layia.
- Involucral bracts flat 18. Blepharipappus.
- Rays yellow.
- Disk-flowers purple or brown.
- Receptacle strongly conical 20. Rudbeckia.
- Receptacle flat or convex.
- Leaves parted 21. Coreopsis.
- Leaves not parted.
- Achene flat 22. Helianthella.
- Achenes 4-angled 23. Helianthus.
- Disk-flowers yellow.
- Pappus of awns or scales.
- Awns retrorsely barbed 26. Bidens.
- Awns or scales not retrorsely barbed 23. Helianthus.
- Pappus none.
- Heads large, leaves broad.
- Pappus none 24. Balsamorhiza.
- Pappus a toothed crown 25. Wyethia.
- Heads small, leaves linear-lanceolate.
- Achenes glabrous, receptacle chaffy marginally 16. Madia.
- Achenes pubescent, receptacle fimbriate 19. Hemizonella.

Tribe IV. HELENIEÆ

Much as in *Heliantheæ*, but the receptacle not chaffy (fimbriate in *Gaillardia*); involucral bracts green.

- Leaves opposite, receptacle conical or subulate 28. Baeria.
- Leaves alternate, receptacle flat or convex.
- Heads discoid.
- Involucral bracts united at base 29. Eriophyllum.
- Involucral bracts separate 30. Chænactis.
- Heads radiate.
- Involucral bracts united at base, plants woolly 29. Eriophyllum.
- Involucral bracts separate, plants not woolly.
- Receptacle fimbriate, disk purplish, involucral bracts erect 27. Gaillardia.
- Receptacle naked, disk yellow, involucral bracts reflexed 31. Helenium.

Tribe V. ANTHEMIDEÆ

Distinguished from the last two tribes by the usually scarious involucral bracts; receptacle naked or chaffy; anthers not caudate; style-branches of the perfect flowers truncate, achenes mostly small and short; pappus none, chaffy or crown-like.

- Heads radiate (rays usually white).
- Rays 2-5 mm. long, receptacle chaffy 32. Achillea.
- Rays 1 cm. or more long.
- Receptacle chaffy at least at apex 33. Anthemis.
- Receptacle naked 34. Chrysanthemum.
- Heads discoid, receptacle naked.
- Heads small, or rarely 1 cm. broad, in spike-like or racemose-paniculate inflorescences 35. Artemisia.
- Heads solitary or corymbose, about 1 cm. broad.
- Receptacle conical 36. Matricaria.
- Receptacle flat or convex.
- Heads in corymbs; tall plants 37. Tanacetum.
- Heads solitary on slender peduncles; low plants 38. Cotula.

Tribe VI. SENECTIONEÆ

Leaves opposite, alternate; heads radiate or discoid, involucre bracts rarely scarious, little if at all imbricated, in 1-2 series; receptacle mostly naked; anthers not caudate; pappus capillary, style-branches truncate or appendaged, not flattened.

- Leaves radical; heads monœcious or sub-diœcious 39. Petasites.
 Stems leafy, flowers all fertile.
 Leaves opposite 40. Arnica.
 Leaves alternate.
 Heads radiate.
 Receptacle conical, heads solitary 41. Crocidium.
 Receptacle flat, heads usually many 42. Senecio.
 Heads rayless.
 Shrubby 43. Tetradychia.
 Herbaceous.
 Flowers creamy, 10-20 44. Luina.
 Flowers yellow, many 42. Senecio.

Tribe VII. INULEÆ

Mostly tomentose herbs with usually entire leaves; heads discoid, the pistillate flowers mostly filiform; anthers caudate (exc. in *Adenocaulon*); style-branches not appendaged, truncate; receptacle naked (exc. in *Psilocarphus*); pappus of capillary bristles or none.

- Leaves broadly deltoid, green above, white-tomentose beneath 45. Adenocaulon.
 Leaves linear to oblong or spatulate.
 Leaves opposite, the fertile flowers enclosed in bracts 46. Psilocarphus.
 Leaves alternate, the flowers not enclosed.
 Heads diœcious; pappus of sterile flowers broadened at apex, of the fertile capillary and united at base 47. Antennaria.
 Heads diœcious or nearly so, pappus not thickened nor united at base; the involucre bracts in very many rows 48. Anaphalis.
 Heads all fertile; pappus capillary; involucre bracts in several rows 49. Gnaphalium.

Tribe VIII. CYNAREÆ

Leaves alternate, heads rayless; flowers all tubular and all perfect, the outer ray-like and neutral in *Centaurea*; involucre much imbricated; receptacle naked or chaffy; anthers caudate, long appendaged at tip; style-branches short or united, obtuse and unappendaged; pappus various, mostly of bristles.

- Involucre bracts hooked. 50. Arctium.
 Involucre bracts not hooked.
 Leaves not prickly.
 Inner row of pappus of plumose, the outer of simple, bristles; Mt. plants 51. Saussurea.
 Pappus none or of simple bristles; introd. plants 52. Centaurea.
 Leaves more or less prickly.
 Achenes attached by the very base, flowers all alike.
 Filaments glabrous united, leaves mottled 53. Silybum.
 Filaments papillose-pilose, separate, leaves not mottled.
 Pappus of plumose bristles 54. Carduus.
 Pappus of simple bristles, stems winged 55. Onopordium.
 Achenes attached obliquely, marginal flowers often enlarged and ray-like 52. Centaurea.

Artificial Key to the Genera of Series I

- Shrubs.
 Pappus none 35. Artemisia.
 Pappus of capillary bristles.
 Involucre of 4-5 bracts 43. Tetradychia.
 Involucre of about 10 bracts 11. Bigelovia.
 Herbs.
 Heads radiate.
 Rays yellow.
 Pappus not of capillary bristles.
 Involucre gummy or glandular-viscid.
 Rays long, pappus of rigid awns 3. Grindelia.
 Rays short, pappus of scales 16. Madia.
 Involucre not gummy nor glandular-viscid.

- Receptacle not chaffy nor bristly (v. *Heleniææ*).
 Leaves strongly decurrent 31. *Helenium*.
 Leaves white-tomentose beneath 29. *Eriophyllum*.
 Leaves otherwise, low plants 28. *Baeria*.
 Receptacle chaffy or bristly (v. *Heleantheæ*)
 Pappus of awns or teeth.
 Awns retrorsely barbed 26. *Bidens*.
 Awns or teeth not retrorsely barbed.
 Involucre bracts distinct, somewhat foliaceous. 22. *Helianthella*.
 Involucre bracts more or less united at base 21. *Coreopsis*.
 Pappus of scales.
 Scales several, long, awn-tipped 27. *Gaillardia*.
 Scales 2, long, not awn-tipped, often with shorter ones 23. *Helianthus*.
 Pappus none or a mere crown.
 Leaves dissected 33. *Anthemis*.
 Leaves not dissected.
 Receptacle conical 20. *Rudbeckia*.
 Receptacle not conical.
 Involucral bracts enfolding the achenes of the ray flowers, leaves narrow.
 Achenes laterally compressed 16. *Madia*.
 Achenes terete or obcompressed 19. *Hemizonella*.
 Involucral bracts not enfolding the outer achenes; leaves ample.
 Pappus none 24. *Balsamorhiza*.
 Pappus a toothed crown 25. *Wyethia*.
 Pappus of capillary bristles.
 Leaves opposite 40. *Arnica*.
 Leaves alternate.
 Involucral bracts in 2-4 series.
 Heads 3-7 mm. high. 9. *Solidago*.
 Heads 1-1.5 cm. high 6. *Chrysopsis*.
 Involucral bracts in 1 series or with a few small basal ones.
 Annuals.
 Rays conspicuous 41. *Crocidium*.
 Rays inconspicuous 42. *Senecio*.
 Perennials.
 Involucral bracts broad 8. *Aplopappus*.
 Involucral bracts narrow.
 Pubescence harsh, rays in more than 1 series 5. *Erigeron*.
 Pubescence none or soft, the rays in 1 series 42. *Senecio*.
 Rays not yellow.
 Pappus none or a mere crown.
 Leaves entire, involucral bracts herbaceous 7. *Bellis*.
 Leaves dissected or lobed; involucral bracts scarious (v. *Anthemideæ*).
 Rays 2-3 mm. long 32. *Achillea*.
 Rays longer.
 Leaves dissected 33. *Anthemis*.
 Leaves toothed or lobed 34. *Chrysanthemum*.
 Pappus of capillary bristles or of awns.
 Rays small or inconspicuous.
 Stems scapose, leaves radical, ample 39. *Petasites*.
 Stems leafy, leaves small 10. *Seriocarpus*.
 Rays conspicuous, 6 mm. long or more.
 Rays in more than 1 row, bracts of involucre in 1 row or series 5. *Erigeron*.
 Rays in 1 row.
 Perennial, usually tall; bracts of involucre in several series; pappus capillary 4. *Aster*.
 Low annuals; bracts of involucre in one series, pappus not capillary.
 Disk-flowers many, pappus of awns 17. *Layia*.
 Disk-flowers 6-12, pappus of bristle-like scales 18. *Blepharipappus*.
 Heads discoid.
 Pappus not of capillary bristles.
 Receptacle bristly or chaffy at least marginally.
 Marginal corollas ray-like, deeply lobed 52. *Centaurea*.
 Corollas merely toothed.
 Pappus none or a mere crown.
 Involucre tubercled or spiny.
 13. *Ambrosia*, 14. *Franseria*, 15. *Xanthium*; v. *Heliantheæ*.
 Involucre not tubercled nor spiny.
 Plants very viscid, the outer achenes enclosed in the involucral bracts 16. *Madia*.

Plants not viscid.

Pistillate flowers enclosed by the inflated chaff; low woolly plants 46. *Psilocarphus*.

Pistillate flowers not so enclosed.

Bracts of involucre in 1 series, somewhat united. 12. *Iva*.

Bracts of involucre in several series, distinct 35. *Artemisia*.

Pappus of awns retrorsely barbed 26. *Bidens*.

Receptacle naked.

Leaves broadly ovate-cordate, repand 45. *Adenocaulon*.

Leaves narrower or deeply lobed or dissected.

Flowers white, heads 1.5 cm. high 29. *Chænactis*.

Flowers yellow, heads smaller.

35. *Artemisia*; 36. *Matricaria*; 37. *Tanacetum*; 38.

Cotula; v. *Anthemideæ*.

Pappus of capillary bristles.

Leaves prickly (v. *Cynarææ*).

Receptacle not bristly 55. *Onopordon*.

Receptacle bristly.

Filaments pilose 54. *Carduus*.

Filaments glabrous 53. *Silybum*.

Leaves not prickly.

Receptacle bristly or chaffy (v. *Cynarææ*).

Involucral bracts hooked. 50. *Arctium*.

Involucral bracts without hooks or prickles 51. *Sausurea*.

Receptacle naked.

Stem scape-like. 39. *Petasites*.

Stem leafy.

Flowers purple, tall, coarse plants 1. *Eupatorium*.

Flowers not purple.

Woolly plants.

Involucre of 10-12 bracts, flowers not filiform 44. *Luina*.

Involucral bracts many, flowers often filiform (v.

Inuleæ).

Flowers of 2 kinds in the same head.

Some flowers staminate and sterile 48. *Anaphalis*.

All flowers fertile, either pistillate or perfect 49. *Gnaphalium*.

Staminate and pistillate flowers in separate heads.

Pappus bristles enlarged toward the apex in

staminate flowers. 47. *Antennaria*.

Pappus bristles all capillary. 48. *Anaphalis*.

Plants not woolly.

Flowers white or flesh colored 2. *Brickellia*.

Flowers yellow (*Senecioneæ*).

Leaves opposite 40. *Arnica*.

Leaves alternate.

Pubescence soft or none 42. *Senecio*.

Pubescence harsh 5. *Erigeron*.

Series II. LIGULIFLORÆ. Tribe IX.

Pappus none 56. *Lapsana*.

Pappus of bristles much dilated at base or scaly.

Flowers blue 57. *Cichorium*.

Flowers yellow 58. *Microseris*.

Pappus of capillary bristles.

Bristles plumose.

Flowers pink, leaves linear. 59. *Stephanomeria*.

Flowers yellow, sometimes purple, leaves broader.

Leaves basal.

Some of the achenes long beaked 60. *Hypochæris*.

Achenes not beaked 61. *Leontodon*.

Stems leafy

. 62. *Tragopogon*.

Bristles smooth or barbellate, not plumose.

Heads solitary on scapes; leaves basal.

Pappus tawny 63. *Apargidium*.

Pappus white.

Achenes muricate at apex 64. *Taraxacum*.

Achenes smooth 65. *Agoseris*.

Heads several, stems usually leafy.

Achenes flat or flattish.

Achenes beakless, flowers yellow 66. *Sonchus*.

Achenes beaked, flowers blue, purple or yellow 67. *Lactuca*.

Achenes not flattened.

Flowers whitish 68. *Prenanthes*.

Flowers yellow or rarely pinkish.

Pappus white, achenes often tapering at apex 69. *Crepis*.

Pappus sordid to tawny, achenes not tapering at apex. 70. *Hieracium*.

1. EUPATORIUM (BONESET)

Tall perennials, heads in a broad corymb; involucre campanulate, the bracts in several rows, ovate, obtuse, not scarious; receptacle flat, achenes 5-angled; pappus capillary. (*Eupator Mithridates* is said to have known its medicinal virtues).

1. *E. maculatum* L. Stout, 0.5-1.5 m. high; leaves in whorls of 3-5, ovate to lance-oblong, firm, densely short-pubescent beneath, more or less scabrous above, sharply, often falcately, toothed; corymbs large, somewhat flat, reddish. (*E. Rydbergii* Brit.) Wet grounds, Lower Fraser.

2. *E. cannabinum* L. Leaves opposite, not whorled, completely divided into 3 lanceolate segments. Introd. near Sullivan, Surrey.

2. BRICKELLIA (THOROUGHWORT)

Herbs with white or flesh-colored flowers in corymbose heads; bracts ovate to linear, scabrous, mostly acute, in several series; receptacle flat; pappus capillary; achenes 8-10-ribbed or striate. (*Coleosanthus*) (Brickell was an American botanist).

1. *B. oblongifolia* Nutt. Stem herbaceous from a woody base, 2.5-5 dm. high; leaves alternate, oblong to lanceolate, 2-3 cm. long; the inner bracts narrower than the lanceolate, outer ones; achenes glandular with a few scattered bristles near the summit. Gravelly Soil, D. I.

2. *B. grandiflora* Nutt. Stems 6-9 dm. high; leaves deltoid-cordate, at least the lower opposite, 3-10 cm. long; bracts as in former; achenes not glandular, with a few bristles near the summit. Rocky banks of streams, Kootenay.

3. GRINDELIA (GUM WEED)

Coarse biennials or perennials, often with a woody caudex; leaves alternate, often clasping; heads terminating the branches, the rays yellow, 1-3 cm. long, or wanting; involucre bracts in several series, often reflexed at the tip, mostly glutinous achenes striate or angled, glabrous pappus of 2-8 deciduous awns barbellate under the microscope. (Grindel was a Russian botanist). The genus needs critical revision.

Achenes toothed at summit.

Plants lanate or thinly tomentose on the upper parts, the heads subtended by broad-based bracts

1. *G. lanata*.

Plants pubescent to glabrous.

Plants not strictly glabrous.

Heads 4-6 cm. broad

2. *G. integrifolia*.

Heads about 2.5 cm. broad

3. *G. collina*.

Plants strictly glabrous.

4. *G. nana*.

Achenes not toothed at summit, plant strictly glabrous

5. *G. squarrosa*.

1. *G. lanata* Greene. Stem stout, reddish, the involucre and at least the upper parts of the plant lanate or tomentose; leaves mostly entire, the lower cauline, narrowly spatulate to oblanceolate, sessile but scarcely clasping; the upper broad at the base; heads rather small to large, subtended by broad based bracts; involucre more or less glutinous. Allied to *G. integrifolia* but more pubescent and with narrower leaves. Rocky shores, Victoria; Savary Island. A peculiar form growing on Jones' Island, very lanate beneath the naked head, but without the subtending bracts, rather spreading in habit and with 4-8 awns, 2 of them usually broad based and branching, may be a var. of this species.

2. *G. integrifolia* DC. Stout, stem glabrate or pubescent, leaves firm, yellowish-green, more or less pubescent, entire or serrate, the basal 1-3 dm. long, 1-4 cm. wide, the upper cauline, broad or often dilated at base; heads and rays glutinous; heads 4-6 cm. broad, rays entire, bracts more or less spreading or recurved, achenes bidentate or usually toothed on one side and thus with an oblique summit, striate and angled; awns 2-8. Common near the Coast. A very variable species.

(a) The presumably typical form growing in salt marshes and flowering late ripe fruit at Crescent, Sept. 15th, 1914; glabrate, basal leaves entire in tendency, hardly if at all scabrous on margin, 1-3 dm. long; heads 4-6 cm. broad, bracts with long tips; achenes whitish or brown, oblong, curved, 7 mm. long; awns 2. (Includes *G. macrophylla* Greene).

(b) Var. *æstivalis*. Growing on rocky shores or hillsides, Victoria, flowering in May, ripening fruit in July; pubescent, leaves serrate in tendency, scabrous on margin, basal leaves 1-1.5 dm. long; heads 3-4.5 cm. broad; bracts slightly broader, with shorter tips; achenes 5 mm. long, oblong-ovoid, awns 2-8.

(c) Var. *autumnalis*. Growing with the preceding, flowering in August, glabrate or pubescent, leaves spongy, scabrous on margins, dark-green, rather more glutinous than in the above, the larger 4 cm. broad, bases broad, entire or serrate; heads 4-5 cm. broad; rays often 5 mm. broad, bracts medium.

(d) *G. stricta* DC. Stem strict, sub-simple, glabrous at base, sparsely pilose above, stem-leaves attenuate at base, oblong, acuminate, serrate towards apex; involucre scales erect, linear, acuminate. Victoria; Q. Charlotte Is.

3. *G. collina* s. n. Stems rather slender, 3-7 dm. high, pubescent throughout, arachnoid-pubescent above; the margins of the upper leaves often short-woolly; upper leaves oblong-oblancoate, with broad, but not dilated, bases, 2-3 cm. long, about 5 mm. wide, mostly serrate; basal leaves narrowly oblanceolate, 6-16 cm. long, none of them 1 cm. broad, entire or usually more or less lightly serrate, pubescent on the margin; heads small, involucre 7-10 mm. high; limb of the light-yellow rays entire or 3-toothed, not 1 cm. long; involucre pubescent, glutinous, the rather short tips of the outer, linear-lanceolate bracts more or less recurving or spreading; achenes 3 angled, 3-4 mm. long, slightly more than half as broad, oblong-obovate, the border toothed; awns 2-3. Dry hillside, Thetis Lake; Victoria; flowers and ripe fruit July 20th. Resembling *G. nana* Nutt. in general appearance.

4. *G. nana* Nutt. Rather slender, 2-7 dm. high; glabrous throughout, leaves narrowly oblanceolate, spinulose serrate, the teeth small, slightly spreading, heads about 2.5 cm. broad, rays entire, the limb scarcely 1 cm. long, involucre bracts with short, strongly recurving tips, achenes narrow; awns 2-3. Dry hills, V. I. (?); Spokane. Var. *discoidea* Gray. Heads rayless; same range.

5. *G. squarrosa* Duval. Entirely glabrous, about 3 dm. high; leaves rigid, serrate or laciniately-serrate, oblong, somewhat obtuse, clasping, the cauline rather small, at midstem less than 4 cm. long; heads medium, 3-3.8 cm. broad; achenes short, the outer thicker; involucre bracts very strongly recurving; pappus of 2 or 3 awns. Dry plains extending into B. C. from Alberta; Chilcoten River; Golden, where it is apparently introd.; a stray specimen on the E. & N. Ry., V. I.

4. ASTER

Summer- or autumn-flowering perennials; heads 1-many, usually on leafy peduncles or branches, rays never yellow, in 1 series, fertile; bracts of involucre imbricated in 2-6 (usually 3 or 4) series, mostly green tipped, often entirely green and passing into the leaves; receptacle flat, alveolate; achenes flattish, mostly pubescent; pappus of rough capillary bristles; stigma tips lanceolate. (Greek *aster*, a star). Related species of this genus are often not well marked and grade into each other.

- Bracts broad, chartaceous, slightly keeled, often purplish (*Eucephalus*). 1. *A. Engelmannii*.
 Bracts rather narrow, green or green-tipped, not keeled.
 Involucre or peduncles glandular.
- Plants canescent 2. *A. canescens*.
 Plants not canescent.
- Outer bracts obtuse, distinctly shorter than the inner.
 Bracts with spreading tips, peduncles long 3. *A. conspicuus*.
 Bracts appressed, peduncles short 4. *A. radulinus*.
 Bracts subequal, attenuate or acute.
- Leaves linear 5. *A. campestris*.
 Leaves lanceolate 6. *A. modestus*.
 Involucre and peduncles not glandular.
- Heads less than 1 cm. broad, rays mostly white.
 Plants nearly glabrous 7. *A. oreganus*.
 Plants rough-pubescent.
- Bracts very unequal, heads nearly sessile 8. *A. multiflorus*.
 Bracts almost equal, heads paniculate.
 Bracts thick with spreading tips 9. *A. commutatus*.
 Bracts thin, appressed 10. *A. falcatus*.
- Heads larger.
- Heads solitary; plants more or less canescent (*Ionactis*).
 Involucres 13-15 mm. high 11. *A. stenomeres*.
 Involucres 8-10 mm. high 12. *A. alpinus*.
- Heads several to many.
 Whole plant canescent. 2. *A. canescens*.
 Only the involucre canescent-tomentose 13. *A. Richardsonii*.
 Plants not canescent nor with canescent involucres.
- Leaves ample, 2-4 cm. broad, the lowest long-petioled
 in Nos. 14 and 15.
- Lower leaves cordate or rounded at base 14. *A. Lindleyana*.
 Lower leaves tapering to the petiole.
- Bracts closely imbricated, white-coriaceous below,
 green-tipped, the outer much shorter than the
 inner.
- Plants not glabrous, upper leaves not clasping 15. *A. MacCallæ*.
 Plants glabrous, upper leaves clasping 16. *A. lævis*.
- Bracts loose often with spreading tips, the outer often
 foliaceous and passing into bracts, upper leaves
 more or less clasping in Nos. 18 and 23.
- Bracts linear-lanceolate, large stem-leaves 4-6 17. *A. foliaceus*.
 Bracts broader.
- Stem-leaves few, plants 2-3 dm. high 18. *A. apricus*.
 Stems leafy, plants taller.
- Bracts subequal 23. *A. Eatoni*.
 Bracts in several unequal series, typically not
 so foliaceous 24. *A. chilensis*.
- Leaves narrow, mostly less than 1.5 cm. broad, the lower
 often not long-petioled.
- Bracts of involucre subulate to linear lanceolate (not at
 all or only obscurely narrowed below the middle);
 heads often few.
- Main stem-leaves linear, none petioled.
 Main stem-leaves usually 1 dm. long or more,
 bracts subequal, the outer often wholly
 herbaceous 19. *A. junceus*.
- Main stem-leaves usually less than 1 dm. long,
 bracts unequal, not wholly herbaceous 20. *A. occidentalis*.
- Main stem-leaves lanceolate, often petioled.
- Heads few in a flattish corymb 21. *A. Fremontii*.
 Heads usually many, paniced 22. *A. Douglasii*.
- Bracts of involucre spatulate or oblanceolate (more or
 less narrowed at or below the middle) often foliace-
 ous and passing into small leaves, heads usually
 many.
- Leaves scaberulous on the upper surface.
- Rays less than 1 cm. long 25. *A. microlonchus*.
 Rays more than 1 cm. long 22. *A. Douglasii*.
- Leaves smooth on the upper surface.
- Leaves linear, bracts slightly narrowed below the
 middle 20. *A. occidentalis*.
 Leaves lanceolate, bracts clearly narrowed below
 the middle.
- Leaves thick, the lower persistent, often more
 than 1 cm. broad 23. *A. Eatoni*.
 Leaves thin to firm, usually less than 1 cm. broad,
 the lower often wanting at flowering 22. *A. Douglasii*.

1. **A. Engelmännii** Gray. Stem 2.5-9 dm. high, rather stout, puberulent to glabrous; leaves thin, broadly lanceolate, sessile, entire or serrate, pubescent beneath, obscurely scaberrulous above; heads rather few, in a corymb, on naked peduncles; bracts tomentose or pubescent on the margins, puberulent on the back, often purple-tipped, in 3 or 4 very unequal series, rays light-purple, about 15 mm. long; lower pappus-bristles sometimes enlarged at tip. Mts., Cascades to Rockies; Colwood, Victoria. Somewhat resembling *A. conspicuus*, but the leaves are not scabrous and smaller. (*A. macounii* Greene).

2. **A. canescens** Pursh. Branching from the base, 3-5 dm. high, canescent throughout; leaves linear or narrowly oblanceolate, entire; bracts usually somewhat glandular, erect or often with spreading tips; heads mostly solitary at the ends of the branches, 3-4 cm. broad. Dry plains; Summerland.

3. **A. conspicuus** Lindl. Tall, 6-12 dm. high; leaves large, coarse, scabrous on both sides, serrate, ovate to obovate, often slightly narrowed below the middle to a broad, round base, sessile; bracts thick, lanceolate, well imbricated with slightly spreading tips, very unequal, glandular; heads corymbose, on nearly naked branches; rays violet; involucre campanulate. Princeton and Spence's Bridge, eastward to Alberta.

4. **A. radulinus** Gray. Similar, leaves narrower, oblong (or the lower obovate-spatulate) tapering to a narrow base; peduncles short; bracts little, if at all glandular; involucre obconical; rays purple or white. D. I.; Valley of Fraser.

5. **A. campestris** Nutt. Stem rather slender, 2-4 dm. high; often purple; leaves broadly linear, indistinctly 3-nerved, smooth or pubescent, minutely glandular, entire; bracts lanceolate, usually glandular; peduncles glandular; heads racemose, paniculate, rays dark-blue, about 15 mm. long. Kootenay.

6. **A. modestus** Lindl. Stems simple, 4-6 dm. high, rather slender, villous with a more or less ample corymbose glandular panicle; leaves lanceolate, 1-2 cm. wide, barely clasping, pubescent below, glabrous or nearly so above, entire or with a few sharp teeth; bracts linear, acuminate, often purplish, somewhat spreading, subequal; rays light-purple, sometimes white, often 2 cm. long; disk flowers often purplish. Duncan, V. I., Elgin; Dewdney Trail and eastward.

7. **A. oreganus** Nutt. Nearly glabrous, about 6 dm. high; leaves linear-lanceolate, entire; heads several to many paniculate, about 6 mm. high; bracts of involucre loose, the outer herbaceous, lanceolate; acute rays about 4 mm. long, white or purplish. Valley of Kicking Horse; Bear Creek, Selkirk.

8. **A. multiflorus** Ait. Bushy, 6-12 dm. high; stems somewhat strigose; leaves sessile, 1-2 cm. long, linear-oblong, greyish-canescant, small and crowded on the branches; heads 6-8 mm. broad, crowded, nearly sessile; the short, green tips of the bracts spreading; rays 3-4 mm. long, white. Princeton; Okanagan; the Rockies and eastward.

9. **A. commutatus** Gray. Similar, 3-6 dm. high; pubescent, stem-leaves 2-7 cm. long; heads 12-16 mm. broad, rays about 6 mm. long, inflorescence paniculate, the heads often on long, slender, leafy branches. Range of the last.

10. **A. falcatus** Lindl. Distinguished from the preceding species by the sparingly strigose leaves, in age often glabrate. MacKenzie and Alaska southw. in Rockies to Colorado.

11. **A. stenomerus** Gray. Stem 1.5-3 dm. high, woody at base, densely clothed with narrowly oblong, scabrous, entire leaves, about 2 cm. long, acute, mucronate-tipped; bracts erect, lanceolate, acuminate, in 2 series; rays violet, about 18 mm. long; pappus double. Dry, gravelly hills; Rockies; Kootenay.

12. *A. alpinus* L. About 1 dm. high, rough-pubescent throughout; leaves entire, the cauline linear-oblong, the basal mostly obtuse and terminating in a short mucro; heads solitary, about 3 cm. broad; bracts oblong in 2-3 series, acute, nearly 1 cm. long; rays violet; pappus double; Rockies.

13. *A. Richardsonii* Spreng. Slender, leafy to the base, branching, 1-5 dm. high, pubescent throughout except on the upper surface of the leaves; leaves oblong-oblancoate or the lower spatulate, about 1 cm. broad, subentire to serrate; heads few to several in corymbs, 2-3 cm. broad, bracts often purplish, obtuse or acute; pappus tawny. Trout Lake City; Golden; northward in the Rockies.

14. *A. Lindleyana* T. & G. Stem slightly pubescent above, 3-15 dm. high; leaves glabrous or nearly so, except on margins, coarsely or finely serrate, the basal broadly lanceolate, cordate or rounded at base, abruptly contracting to a winged petiole; those of the inflorescence lanceolate; panicle often large, heads 2.5-3 cm. broad, involucre 6-8 mm. long, bracts subulate, glabrous or ciliate, coriaceous except on green midrib and acute green apex, unequal, in several series; rays blue-violet, about 10 mm. long, disk-flowers usually reddish-purple, achenes glabrous. Common east of the Cascades; Armstrong; Summerland, northward and eastward. Very closely allied are: *A. Wilsonii* Rydb. Petioles and midribs and often stems pubescent with long, white hairs, rays 8-10 mm. long; and *A. Butleri* Rydb. Lower leaves lanceolate, tapering at base, achenes hispidulous-strigose; distinguished from *A. MacCallæ* by the numerous smaller heads with involucre 5-6 mm. high, and rays 8-10 mm. long. Both common in the Okanagan Valley; Armstrong.

15. *A. MacCallæ* Rydb. Stems 3-6 dm. high, glabrous to the inflorescence, the branches of which are pubescent in lines; lower leaves tapering to winged slightly ciliate petioles, blades broadly lanceolate, 8-15 cm. long, (those of the inflorescence lance-linear), usually more or less serrate, glabrous except on margins, rather thick; heads few, racemed; involucre 8-9 mm. high; rays about 15 mm. long, disk-flowers red-purplish; achenes glabrous; bracts subulate, appressed, green at linear-lanceolate tip and on midrib. (*A. præcox* Lindl. not Willd.) Hope to Alberta. Allied to *A. Lindleyana*.

16. *A. lævis* L. var. *Geyeri* Rather stout, 6-9 dm. high, glabrous, leaves thick, entire or serrate, the upper strongly clasping, broadest near the base, oblong-lanceolate, the lower narrowing to winged petioles; heads solitary at ends of branches or 2-3 together; rays blue, about 12 mm. long, bracts white-coriaceous with green, slightly dilated tips, clearly in several series; achenes glabrous. Rockies eastward; Creston.

17. *A. foliaceus* Lindl. Stems smooth below, slightly pubescent above, 3-9 dm. high, leaves few, large, glabrous, entire or denticulate, some of the stem-leaves 2 dm. long including the long petiole; inflorescence sparingly leafy, the heads mostly solitary at the ends of the branches; bracts linear-oblong, glabrous or glabrate, the outer equaling the head and often entirely green; rays purple, 12-20 mm. long. Cascades to Rockies; Armstrong.

18. *A. apricus* (Gray) Howell. Rather low, 1.5-3 dm. high, stem pubescent below the heads, otherwise glabrous except in lines; leaves ample, firm, entire, glabrous except on the margins, the upper oblong, mostly clasping, often strongly so, the lower oblanceolate-obovate or broadly spatulate, often obtuse; heads 1-few, about 3.3 cm. broad, bracts green, broadly oblong or oblanceolate, pubescent on the margins, the lower often leafy. Mts. Coast to Rockies; Mt. Cheam.

19. *A. junceus* Ait. Slender, 3-9 dm. high, heads rather few, terminating the branches; leaves linear, the principal stem-leaves 1-1.5 dm. long, entire, or the lower sparingly denticulate, smooth or the margin scabrous; inflorescence simple or little branched, heads about 2.5 cm. broad; bracts small, narrow, green-tipped, the outer usually somewhat shorter; rays purple or white, 1 cm. long. Chilcoten River, and northward.

20. *A. occidentalis* Nutt. Stem slender, nearly glabrous or pubescent in lines, 3-6 dm. high, often simple; leaves narrow, linear to narrowly lanceolate entire or slightly serrate along the middle, 5-9 cm. long, not petioled; heads few to many, often solitary at ends of branches, of medium size, rays 8-15 mm. long, mauve or bluish; bracts linear. Kootenay. Here are also included coast forms with slightly broader bracts, forms which may very likely be assignable to *A. Douglasii* with which they grow, and from which they are distinguished by their narrow leaves, simple habit, and mauve rays. Low lands, Crescent.

21. *A. Fremontii* Gray. Stems slender, 2-5 dm. high, glabrous or pubescent above; leaves thin, margins smooth or obscurely ciliate, the lower oblong to oblanceolate, 3-7 cm. long, tapering into a margined petiole, the cauline somewhat clasping; heads few in a flat-topped corymb, on nearly naked peduncles; bracts linear, the outer obtuse; rays 8-12 mm. long. Mt. meadows, Rockies.

22. *A. Douglasii* Lindl. Stems green or purple, rather slender, rather uniformly pubescent to nearly glabrous, 5-10 dm. high; leaves dark green, mostly very numerous, narrowly lanceolate, to lance-oblong, entire or slightly toothed along the middle, very scabrous to moderately so on or towards the margin, sometimes scabrous on the whole upper surface; thin to firm, hardly petioled, the lower often withered at flowering; panicle usually large, much branched; rays blue-purple or pink; heads medium, 3-3.5 cm. broad; involucre usually campanulate. Includes much diverse material. The first reference in the key is to Kamloops plants, which, except for the narrow bracts look much like *A. Eatoni*. The other references are to the very common coast Aster with broader, sometimes foliaceous, bracts, and more leafy stems. On V. I. the leaves are sometimes scabrous on the upper surface.

23. *A. Eatoni* (Gray). Howell. Branching and leafy, 5-9 dm. high; pubescence somewhat in lines above; leaves lanceolate, but not narrowly so, entire or serrate, thick, glabrous, or sometimes scabrous on the upper face, slightly clasping above; petioles short below; involucre bracts acute, ciliate, subequal, loosely imbricated, more or less foliaceous; heads 3-4 cm. broad, rays blue. V.I.; New Westminster; Montana.

24. *A. chilensis* (Nees) DC. Branching, not so closely leafy, the leaves reduced above, 5-14 dm. high; pubescence of stem in lines; leaves thick, dark-green, broadly lanceolate, the upper hardly clasping, the petiole of lower not long, entire or serrate, glabrous or scabrous on the upper surface, pubescent or glabrous beneath; involucre bracts oblong, acute or obtuse, ciliate, clearly unequal, pale below with green tips; heads 3-4.5 cm. broad, rays mauve. *A. Chamissonis* Gray. Chile; Cal.; Victoria; Crescent. A common and beautiful Aster at Crescent, where, in shade, the bracts become foliaceous and the leaves thinner and broader. Often referred to No. 23 from which our plant may not be distinct.

25. *A. microlonchus* Greene. Stems rather slender, about 6 dm. high, glabrous below, pubescent above; leaves linear to lanceolate, all often under 6 mm. broad, slightly clasping at base, delicately rough on the upper surface, entire, thin, the basal withered at flowering; panicle narrow to pyramidal, often large; heads subracemose or solitary at the ends of the branches, hardly 2.5 cm. broad, the rays light violet, less than 1 cm. long; bracts narrowly oblong-spatulate, acutish, or the outer obtuse, scaberulous, at least, marginally. Victoria; Cascades; Armstrong.

5. ERIGERON (FLEABANE)

Annuals or perennials; heads 1-many, radiate or rayless; rays fertile, usually in more than 1 series, various in color, often narrow; bracts of the involucre not much imbricated, usually in 1 series, usually not herbaceous; receptacle flat, punctate; achenes flattish, usually pubescent; pappus of rough

capillary bristles, often double, with a minute outer whorl; stigma-tips ovate; differing from *Aster* chiefly in the very numerous, usually narrow rays, usually in more than 1 series, and in the narrow, subequal, involucre bracts, which are little, if at all, imbricated, and never coriaceous or foliaceous. (Greek *er*, spring, and *geron*, an old man; some spring species are hoary).

- Rays inconspicuous, hardly exceeding the pappus, or wanting.
- Leaves dissected 7. *E. compositus* var.
 - Leaves not dissected.
 - Heads 4 mm. wide 1. *E. canadensis*.
 - Heads much wider.
 - Bracts eglandular.
 - Hirsutulous; involucre 8-10 mm. high 2. *E. elatus*.
 - Hairs bristly; involucre 6-8 mm. high 3. *E. lonchophyllus*.
 - Bracts more or less glandular.
 - Bracts glandular to apex 4. *E. acris*.
 - Bracts glandular only at base 5. *E. Kindbergii*.
- Rays conspicuous.
- Plants soon producing runners, or filiform horizontal branches 6. *E. flagellaris*.
 - Plants without runners.
 - Leaves dissected 7. *E. compositus*.
 - Leaves entire or merely dentate.
 - Rays yellow.
 - Leaves obovate 8. *E. aureus*.
 - Leaves linear 9. *E. filifolius*.
 - Rays not yellow.
 - Involucre woolly; plants strictly monocephalous, low, alpine.
 - Rays 1 cm. long, or more.
 - Bracts tomentose 15. *E. grandiflorus*.
 - Bracts canescently strigose 16. *E. Macounii*.
 - Rays shorter.
 - Stems scapose, achenes glabrous 17. *E. lanatus*.
 - Stems with about 3 leaves, achenes pubescent 18. *E. uniflorus*.
 - Involucre not densely woolly, though often hirsute; stems mostly more than 2 dm. high, heads 1 to several.
 - Stems usually solitary, or heads large (disk over 1 cm. broad).
 - Rays broad (2.5 mm.) bracts of the involucre loose, pappus simple.
 - Bracts of involucre tomentose or pilose, rays 20-30 19. *E. peregrinus*.
 - Bracts of involucre not tomentose or pilose, rays 40-70.
 - Leaves 12 mm. broad, or less, elongated 20. *E. loratus*.
 - Leaves broader 21. *E. callianthemus*.
 - Rays narrow, 1-1.5 mm. broad, bracts appressed, pappus often double.
 - Annuals or biennials.
 - Stem strigose, pappus of rays usually wanting 22. *E. ramosus*.
 - Stems and leaves distinctly short-pubescent, pappus present 23. *E. Bellidiastrum*.
 - Perennials.
 - Leaves strongly 3-nerved beneath, pubescent. 25. *E. corymbosus*.
 - Leaves not prominently nerved.
 - Upper stem-leaves reduced, involucre eglandular, leaves hirsute above.
 - Leaves 1.5-3 cm. broad, clasping above 24. *E. philadelphicus*.
 - Leaves narrower, not clasping 26. *E. glabellus*.
 - Upper stem-leaves not much reduced, leaves glabrous above.
 - Bracts of involucre glandular-puberulent, but not at all hirsute 27. *E. macranthus*.
 - Bracts of involucre glandular and hirsute, rays 100 or more 28. *E. speciosus*.
 - Stems tufted, heads small (disk 1 cm. or less in breadth).
 - Stems simple, naked above, 7-15 cm. high 10. *E. poliospermus*.
 - Stems usually branching, leafy above, taller.
 - Stems hirsute with spreading hairs, pappus double.
 - Rays white, 6-8 mm. long 11. *E. pumilus*.
 - Rays blue, 8-12 mm. long 12. *E. concinnus*.
 - Stems canescent or with short pubescence.
 - Stem leaves filiform, pappus simple 13. *E. linearis*.
 - Stem leaves linear-oblong, pappus double 14. *E. cæspitosus*.

1. *E. canadensis* L. (HORSE-WEED). Bristly-hairy, annual, 2-6 dm. high; stiffly erect; leaves linear, about 4 cm. long, bristly hairy, especially on the margins at the base, entire or nearly so, the radical lobed; heads paniced; rays white, hardly exceeding the involucre. A common weed.

2. *E. elatus* Greene. Stems several 1.5-4.5 dm. high, hirsutulous, sparing leafy; except at base; basal leaves spatulate to oblanceolate, obtuse, entire, glabrous beneath, sparsely strigose above; the cauline linear-lanceolate to linear, sessile; heads 1-5; involucre 8-10 mm. high, 12 mm. broad, the bracts short-hirsute, very unequal; rays elongated, bright pink-purple; pappus white, rather copious. (*E. alpinus elata* Hook.). Rockies.

3. *E. lonchophyllus* Hook. Biennial, sparsely bristly-hairy; stems clustered, 1-3 dm. high; leaves of stem linear, 4-10 cm. long, glabrous above, hirsutely ciliate below the middle; the basal narrowly spatulate or oblanceolate; heads usually single, racemose with erect peduncles; involucre bracts 6-8 mm. long, abruptly acute, equaling or shorter than the head; rays filiform, purplish or whitish, projecting 1-2 mm. beyond the whitish pappus. Field; Kamloops.

4. *E. acris* L. Stems usually clustered; more or less hirsute-pubescent, 1-5 dm. high, perennial or biennial; stem-leaves oblong-lanceolate, hirsute, especially towards the base; about 3-4 mm. broad, and 2.5-8 cm. long; the basal leaves spatulate or oblanceolate; heads few or usually several to numerous, racemose or paniced, the branches ascending; pistillate, filiform flowers within the row of rays; bracts of involucre attenuate, hirsute towards the base; rays purplish, equaling or a little exceeding the whitish or brownish pappus. Alaska to Col. var. *Dræbachiensis* Blytt. Glabrate, 3-6 dm. high, basal leaves spatulate; heads usually paniculate; involucre glandular, but hardly hirsute. Var. *debilis* Gray. Low, 5-15 cm. high, perennial, basal leaves spatulate, obtuse, sparsely hirsute-pubescent; heads few, rays a little exceeding the pappus. Rockies; Selkirks; Mt. Garibaldi.

4a. *E. lapiluteus* A. Nels. Stem usually solitary, 3-6 dm. high, leaves oblanceolate, the upper not much reduced, rays largely concealed by the pappus. Another segregate form *A. acris*; Laggan. (Miss Farr).

5. *E. Kindbergi* Greene. Perennial 1.5 dm. high, stem pilose-pubescent, apparently flaccid; lowest leaves oblanceolate, acute, entire; the cauline narrowly linear, sessile by an abruptly dilated base; heads mostly solitary, small, the involucre barely 6 mm. high, the bracts very unequal, glabrous and glandless except at the pilose-pubescent base; pappus rather scanty, dull white. Stump Lake.

6. *E. flagellaris* Gray. Appressed-pubescent, at length stoloniferous; stems slender, 1-2 dm. high, naked above; basal leaves oblong or spatulate, entire, the upper reduced; peduncles elongated; heads solitary, 1.5-2 cm. broad; rays pink or white, very numerous; involucre hirsute; pappus double, the outer series of short bristles. Spence's Bridge; Ashcroft.

7. *E. compositus* Pursh. Low, 1 dm. high, with a woody base; tufted; hirsute to glabrate, densely leafy at base; leaves 1-3-ternately parted, wing-petioled, the lobes linear or spatulate; stems bearing solitary heads, 12-15 mm. broad; rays violet or white, 5 mm. long, not very narrow. Mt. Cheam; Princeton; Golden. Var. *discoideus* Gray. Rays wanting. Golden. Var. *nudus* (Rydb.) Almost entirely smooth, except on the involucre. Rockies. Var. *trifidus* (Hook.) Gray. Leaves 3-cleft, the segments entire or the lateral 2-lobed, radiate or discoid. Kootenay. Var. *glabratus* Macoun. Leaves viscous or glandular. Mts., Kicking Horse Lake.

8. *E. aureus* Greene. Canescent, less than 1 dm. high, stems solitary or several; basal leaves spatulate, entire, petioled; the cauline narrower, sessile; heads solitary, including the rays 1.5-2 cm. broad; involucre tomentose; rays deep-yellow, not very narrow, obscurely 2-ranked. Alpine, Coast Mts. to Rockies. (*Aplopappus Brandegii* Gray).

9. *E. filifolius*. Somewhat similar in general appearance to *E. linearis*; appressed-pubescent throughout, stems 1-2 dm. high, naked above, leaves narrowly or broadly linear, few; heads solitary or few, 1.5-2 cm. broad; involucre bracts scarious-margined with dark centre, hirsute; rays nearly 1 cm. long; pappus with shorter bristles intermixed. Ashcroft; Summerland.

10. *E. poliospermus* Gray. Tufted, stems many, short, leafy, pubescent; leaves spatulate to lanceolate, 8-15 mm. long, hirsute; peduncles naked or with a filiform bract; rays 20-30, violet to almost white; heads, including the rays, 20-25 cm. broad, involucre hirsute; pappus double. North Kootenay Pass; Mon.

11. *E. pumilus* T. & G. Tufted, slender, 1-2.5 dm. high, leafy; pubescence rough, spreading; basal leaves 2-10 cm. long, 1-nerved, spatulate-linear, with a petiole as long as the blade; the cauline erect, linear; involucre 8-10 mm. broad; hirsute, rays white, 50-80, 6-8 mm. long, at length deflexed; the outer pappus of short bristles. Dry hills, Alberta to Wn.; perhaps in B. C.

12. *E. concinnus* Nutt. Stems tufted, slender, simple or branched, branches erect, 1.5-2.5 dm. high; pubescence bristly hirsute, long, spreading; lower leaves entire, hirsute, linear to very narrowly lanceolate, 4-8 cm. long, stem leaves linear, erect; involucre 10-12 mm. broad, bristly-hirsute; rays 50-80, blue, sometimes white, 8-12 mm. long; pappus double, the outer conspicuous, slightly scaly. Dry hills and plains, Princeton; Summerland; Cranbrook.

13. *E. linearis* (Hook) Piper. Canescent without loose hairs; stems tufted, slender, from a woody base; simple or branching; leaves filiform or linear, 2-5 cm. long; involucre 4-5 mm. high, rays about 50, 5-8 mm. long, violet or sometimes white; pappus simple. Very common east of Cascades.

14. *E. cæspitosus* Nutt. Tufted, 2-3 dm. high; hardly canescent, with short, rather dense, more or less appressed pubescence; lower leaves spatulate or oblanceolate, 2-5 cm. long, stem-leaves narrowly oblong, ascending; stems simple or branching, about 2 dm. high; involucre 4-5 mm. long, the bracts not acuminate, lanceolate-oblong; rays about 50, white, pink or violet, 40-10 mm. long; pappus double. Dry plains, Summerland.

15. *E. grandiflorus*. Hook. Stem stout, about 1.5 dm. high, densely pubescent; basal leaves short-petioled, 3-5 cm. long, oblanceolate-spatulate; the cauline several, narrowly lanceolate; involucre not very densely woolly; bracts with loose tips; heads large; achenes pubescent. Rockies northward.

16. *E. Macounii* Greene. Stems stout, canescent, about 1.5 dm. high, usually several, with solitary heads; basal leaves spatulate to oblanceolate, the petiole about as long as the blade or short; stem-leaves linear, 4 or more; heads very large, the disk 2-3 cm. broad, rays 1.5-2 cm. long, about 50, 2.5 mm. broad, blue-purple; involucre bracts unequal with spreading tips, slightly tomentose; achenes pubescent. Crow's Nest Pass.

17. *E. lanatus* Hook. Similar, stems 0.5-1.5 dm. high, tufted, or solitary, scapiform or with a single leaf; leaves hirsute, oblanceolate or spatulate, 1-2 cm. long, sometimes 3-lobed; involucre densely soft-lanate; the bracts rather close or merely the tips spreading. Rockies, northward.

18. *E. uniflorus* L. One dm. high, or less; stems solitary or several in a small tuft, clothed with whitish yellowish or purplish woolly hairs; leaves hirsute, the basal spatulate to oblanceolate-oblong, 1-4 cm. long, stem-leaves several, narrowly oblong; heads usually solitary, about 1 cm. high; involucre dark-purple, with dense lanate pubescence, similar to that of the stem, or hirsute as well as lanate; the bracts erect, loose; rays whitish or purplish, not much exceeding the involucre. Mts. above 2000 m. Coast to Rockies; Alaska.

19. *E. peregrinus* (Pursh.) Greene. Tomentose-pubescent or glabrate; stems slender, 3-6 dm. high, usually solitary, from a slender rootstock; basal leaves 5-8 cm. long, oblong-lanceolate, attenuate to a petiole, the cauline lanceolate, entire, or denticulate; head usually solitary; bracts of involucre linear, acuminate, 10-14 mm. long, not at all viscid or glandular, rays 10-15 mm. long, purplish. Wet meadows, Alaska to Washington. Var. *Dawsoni* Greene. Differs from the species in having its leaves gradually reduced

from the middle upwards, and in having twice as many and much more slender involucre bracts and about 50 rays. Q. Charlotte Islands.

20. **E. loratus** Greene. Similar to No. 21; more slender, leaves glabrate or sparingly pubescent except on the margins; lower 5-20 cm. long, lanceolate, tapering to a long petiole; cauline leaves lanceolate, sessile; heads 3.3-5 cm. broad; bracts of involucre green or purple, with slender, recurved tips, glandular, or not at all glandular-viscid (*E. salsuginosus* in part) Mt. valleys and streams in coast region.

21. **E. callianthemus** Greene. Stems stout, 3-6 dm. high; rather densely soft-pubescent below the heads, more or less pubescent below, leaves firm, glabrate or glabrous except on the margins, acute or obtuse, broadly lanceolate, long-petioled, the middle cauline leaves broadly oblong-lanceolate or oblanceolate, sessile; heads 1-several, 3.5-4.5 cm. broad; involucre mostly glandular; rays violet, rarely white, long and broad. (*E. hesperocallis* Greene. *E. salsuginosus* Gray in part). Mts. Alaska to Cal. **E. membranaceum** Greene. Similar; leaves thin, ample, those of the stem broad at base and clasping; heads smaller. Selkirk.

22. **E. ramosus** (Walt.) B. S. P. (DAISY F.) Annual, stem branching above, 3-6 dm. high, like the leaves with appressed pubescence; leaves entire or dentate, the lowest oblong or spatulate, the upper reduced, lanceolate; heads about 1.5 cm. broad, paniced-corymbose; rays white, twice the length of the hirsute involucre; pappus double, the outer of minute scales. (*E. strigosus* Muhl.) Kootenay.

23. **E. Bellidiastrum** Nutt. Annual, much-branched, cinereous-pubescent, 1-3 dm. high; leaves entire, linear-spatulate, 2-3.5 cm. long; heads several, 1-1.5 cm. broad; involucre hirsute, 4 mm. high; rays 30-60, purplish, about 4 mm. long; pappus simple. Kootenay; Rockies.

24. **E. philadelphicus** L. (COMMON F.) Hairy, perennial, 6-9 dm. high; stem leafy; leaves thinnish, hirsute, the upper clasping, reduced, serrate or entire, the lower often more than 3 cm. wide, broadly oblanceolate, coarsely toothed; heads corymbose-paniculate, many; rays innumerable, very narrow, extending 8 mm. beyond the hairy involucre, rose-purple; pappus simple. Common.

25. **E. corymbosus** Nutt. Stems 3-5 dm. high, with the leaves hispid-pubescent, basal leaves narrowly lanceolate, 1-1.5 dm. long, strongly 3-nerved beneath; the cauline linear; heads several, in flat-topped corymbs; involucre 5-6 mm. high, canescently-pubescent, rays 30-50, about 1 cm. long, blue or sometimes whitish; pappus brownish, short bristles intermixed with the longer. Dry plains east of the Cascades; Kelowna; Kootenay.

26. **E. glabellus** Nutt. Stem pubescent, 1.5-5 dm. high; leaves glabrous to densely hirsute, entire, the basal spatulate or oblanceolate, 5-10 cm. long; stem-leaves oblong to linear, reduced to bracts above; heads large, several or solitary, involucre 1 cm. high, hirsute or pubescent; rays 100 or more, very narrow, blue, violet or white; about 1 cm. long; pappus double, the outer row of minute bristles. (*E. asper* Nutt.) Crow's Nest Pass; Alaska.

27. **E. macranthus** Nutt. Stems glabrous or sparingly strigillose above, leafy, 1-several, from a woody base, 3-8 dm. high; leaves below, oblanceolate, tapering into a winged petiole; above, elliptical-oblong or lanceolate to oval, all more or less hispid and sparingly or short-ciliate on the margins; heads corymbose, rays very numerous, 10-14 mm. long; bracts not at all hirsute, in 2 almost equal series, disk 12-15 mm. wide. Kootenay.

28. **E. speciosus** DC. Stem glabrate or sparsely hirsute, 3-5 dm. high, leafy to the top; lower leaves oblanceolate, tapering to a winged petiole, the upper oblong-lanceolate, broadest just above the somewhat clasping base; all ciliate-margined, glabrous or sparingly hirsute; heads solitary or usually corymbose; disk 11-14 mm. broad; rays blue or violet, not very narrow, 10-18 mm. long; bracts sometimes merely glandular; outer pappus minute. Common east of the Cascades.

6. CHRYSOPSIS (GOLDEN ASTER)

Hairy perennials 2.5-3 dm. high, with solitary or corymbose rather large heads; rays pistillate, yellow; involucre bracts linear, unequal; achenes hairy; pappus double, the outer of small scales or bristles, the inner capillary. (Greek *chrysos*, golden, *opsis*, aspect).

1. *C. villosa* Nutt. Hoary, stems many, tufted, ascending, with plentiful, spreading pubescence; leaves mucronate, oblong to oblanceolate, acute at both ends, the lower petioled, the dense pubescence appressed. Dry plains, Interior.

2. *C. hispida* (Hook.) Nutt. Green, stems and leaves more sparingly hirsute, the pubescence spreading; leaves oblanceolate, very acute. Dry plains, Interior.

7. BELLIS (DAISY)

Tufted perennial, acaulescent herbs; heads solitary on scapes; bracts herbaceous, dark-green, nearly equal, receptacle convex, naked; rays white or pink, the disk yellow; pappus wanting or represented by a few short bristles on the base of the corolla. (Latin *bellus*, pretty).

1. *B. perennis* L. Leaves spatulate, obovate, crenately dentate, achenes obovate, compressed. A common garden escape.

8. APLOPAPPUS

Low herbs with a woody base, alternate leaves and yellow flowers; involucre of rather broad bracts; receptacle flat, honeycombed; pappus of many white or brown bristles, achenes glabrous or pubescent. (Greek *aplous* simple; the pappus is simple).

1. *A. Lyallii* Gray. Stem 1 dm. high, leafy, simple, terminated by a single head; plant glandular-puberulent; leaves spatulate-oblanceolate, entire; bracts foliaceous; rays conspicuous, pappus of white, rough bristles; achenes smooth or nearly so. (For *A. Brandegii* v. *Erigeron aureus*). Alpine, Mt. Cheam to Rockies.

9. SOLIDAGO (GOLDEN-ROD)

Perennial herbs; leaves alternate, entire or serrate; heads small, with small rays; involucre bracts in several series; receptacle honeycombed or fringed; pappus of capillary bristles; achenes usually pubescent. (Latin *solidare*, to make whole, in allusion to medicinal properties).

Inflorescence spicate or its branches not racemiform.

Inflorescence short, involucre bracts acute

Inflorescence 8-20 cm. long, bracts mostly obtuse (acute in *S. lepida*).

Lower leaves obovate, obtuse

Leaves lanceolate or oblanceolate, acute.

Stems glabrous, resinous above

Stems slightly pubescent, at least above, not resinous

Inflorescence broad, with raceme-like branches.

Branches of the inflorescence curving outwards and more or less secund.

Plants glabrous, or nearly so, throughout

Plants not glabrous throughout.

Heads less than 3 mm. long.

Heads more than 3 mm. long

Stems glabrous, heads 4 mm. long

Stems pubescent, heads 5 mm. long

Branches of the inflorescence erect, slightly or not at all secund

1. *S. corymbosa*.

2. *S. decumbens*.

3. *S. glutinosa*.

7. *S. lepida* var.

4. *S. missouriensis*.

5. *S. canadensis*.

6. *S. serotina*.

7. *S. lepida* var.

7. *S. lepida*.

1. *S. corymbosa* Nutt. Stems 1-3 dm. high, ascending pubescent, especially the inflorescence, glabrous below, leafy throughout; leaves thick, entire or serrate, spatulate-obovate, the basal short, obtuse or acute, ciliate at base; inflorescence not elongated; heads 7-9 mm. high, in 1 or more rounded clusters; rays large, 4-5 mm. long, bracts of involucre mostly acute, resinous, ciliate. (*S. multiradiata scopulorum*) Common in the mts.

2. *S. decumbens* Greene. Stems ascending, 2-4 dm. high, pubescent; leaves glabrous, firm, the cauline few, 3 or 4, reduced, entire or serrate towards the apex, the basal long-petioled; heads in a usually elongated thyrses, large 6-8 mm. long; floral bracts linear; involucre bracts obtuse, somewhat resinous; rays large. (*S. humilis nana* Gray). Golden.

3. *S. glutinosa* Nutt. Stem simple, 3-9 dm. high, leafy to the panicle, glabrous, leaves oblong-lanceolate to oval, serrate at apex, the lower 7-10 cm. long, long petioled; glandular or resinous above; heads in an elongated, compound, dense thyrses; rays few and small; involucre bracts obtuse. Mt. Benson; Nootka, V. I.; Oregon.

4. *S. missouriensis* Nutt. Glabrous, or the inflorescence slightly puberulent, slender, 2-5 dm. high; leaves firm and rather rigid, linear-lanceolate, or the lower broadly lanceolate, 3-ribbed, commonly bearing axillary fascicles of small leaves above, entire or sparingly serrate with low teeth; heads 3.5-5 mm. long, on dense, crowded, recurved branches; involucre of thickish, nearly or quite glabrous, blunt bracts; rays small, achenes nearly glabrous. East of Cascades.

5. *S. canadensis* L. Stem rather slender, leaves thin, narrowly lanceolate or linear, glabrous above, minutely pubescent on the nerves beneath, entire or usually sharp-serrate; heads crowded in recurved racemes, pedicels strongly pilose, involucre bracts thin, linear, mostly attenuate, greenish straw-color. Atlantic to Pacific; Okanagan; Chemainus; Skeena Valley.

6. *S. serotina* Ait. Stem glabrous, often glaucous, stout; leaves smooth on both sides, thin, 3-ribbed, sessile or the lowest short-petioled, lanceolate to oblanceolate, very sharply serrate, rough-ciliate; panicle densely or lightly pubescent, the branches curving, with more or less secund branchlets; heads 3.5-4.5 mm. long, the bracts of the involucre very minutely ciliate and puberulent, mostly obtuse, linear, sub-herbaceous to scarious-margined; rays rather long. East of Cascades. Var. *gigantea* Gray. Leaves pubescent on the lower surface; stem somewhat pubescent. Okanagan and northward.

7. *S. lepida* DC. Stem strict, often tall, puberulent, at least above, leaves amply lanceolate, coarsely or moderately serrate (or in vars. sometimes entire) 3-nerved from near the base, scabrous to smooth on the upper surface, more or less pubescent-scabrous on the nerves beneath; panicle short, dense, erect, terminal, almost overtopped by the leaves; involucre 3-5 mm. long, glabrous or pubescent, the bracts linear-subulate. Crescent; Nootka; Alaska. Var. *elongata* (Nutt.) Fernald. Leaves lanceolate; panicle rather definitely terminal, compact, but more elongate, cylindrical to rhombic. The common form, V. I., Coast and eastward; passing by numerous transitions into var. *fallax* Fernald. Panicle subtended by long leaves, pyramidal or corymbiform more or less leafy, 1-3 dm. long, branching, the branches ascending. Elgin; Beavermouth. Var. *polyphylla* (Rydb.) Panicle more or less leafy, the branches spreading or even recurving and secund; grading into the above vars.; Crescent. There is also on the uplands at Elgin a form with a narrow, elongate, leafy panicle, and involucre in 2 or 3 series, that may be referable to *S. caurina* Piper.

10. SERIOCARPUS

Perennial herbs with alternate leaves and simple stems, and the general aspect of a small, whitish Goldenrod; heads few-12, in a small corymb; involucre campanulate in 4 series, the inner bracts scarious with green tips; rays few, white, inconspicuous, achenes narrow, pubescent; pappus of bristles. (Greek *serikos*, silky, *karpos*, a fruit).

1. *S. rigidus* Lindl. Stems ascending, 1.5-2 dm. high, very leafy; leaves spatulate, very scabrous on the entire margins; rays hardly exserted; disk-flowers whitish with purple stamens, shorter than the pappus. Dry, rocky hillsides, Victoria.

11. BIGELOVIA (RABBIT BUSH)

Somewhat shrubby; leaves linear, involute; herbage white tomentose; heads about 5-flowered, discoid, yellow; involucre in 4 series; receptacle honey-combed; achenes villous; pappus capillary, white. (Bigelow was an American botanist).

1. *B. graveolens* Nutt. Plants 4-15 dm. high, the branches erect, pubescent or short-tomentose, leaves revolute; corolla glabrous; bracts of involucre tomentose, oblong. (*B. var. albicaulis*). Plains, D. I.

2. *B. viscidiflora* (Hook.) DC. Plants 5-20 dm. high; stems glabrous; leaves flat, linear, often viscid, the margins more or less distinctly serrulate-scabrous; branches glabrous; heads many, the bracts linear-oblong. Columbia Valley.

12. IVA

Leaves undivided; heads rayless, nodding; greenish; either solitary in the axils or in spikes, the outer flowers fertile, corolla tubular or none; the inner sterile; achenes flattish, obovoid, glabrous; pappus none; receptacle chaffy.

1. *I. axillaris* Pursh. Stems nearly simple, 1-4 dm. high; leaves obovate to oblong or linear, entire, 1-3 cm. long; heads usually solitary in the axils; bracts of the involucre united. Vernon.

13. AMBROSIA (RAGWEED)

Herbs with parted leaves, heads small, monœcious, the staminate in spikes, the pistillate 1-flowered, clustered in the axils; the sterile heads with 7-12 united bracts and anthers almost separate; the pistillate involucre (fruit) resembling an achene, spines in 1 series; style undivided, penicillate. (The ancient name).

1. *A. trifida* L. Stout, 1 m. or more tall, hairy; leaves thick, deeply 3-lobed, scabrous beneath, opposite; sterile involucre 3-ribbed on one side; receptacle naked, fruit obovoid, 5-6-ribbed and tubercled. *Introd.*, Victoria; Revelstoke.

2. *A. artemisiæfolia* L. Stout, 0.3 m. or more high, hairy; leaves 1-2-pinnatifid, often alternate, thin, hoary; receptacle chaffy, fruiting involucre not ribbed, armed with 5-6 acute teeth. Atlantic to Pacific.

14. FRANSERIA (SAND-BUR)

Leaves and heads much as in *Ambrosia*; pistillate involucre 1-4-flowered, armed with spines in more than 1 series, forming a small burr in fruit; style divided. (Franseri was a Spanish botanist).

1. *F. bipinnatifida* Nutt. A prostrate sea-shore perennial; the stems 6-12 dm. long; leaves 3-parted, the segments 2-pinnatifid, hoary; pistillate heads ovate. Beaches along the Coast. (*F. acanthocarpa* Brit. Erect, spines thin, flat, may extend into British Columbia from Alberta).

2. *F. cuneifolia* Nutt. Procumbent, 6-9 dm. high; leaves cuneate-obovate or oblong-ovate with a cuneate base; 3-5-nerved, obtusely serrate, the lower often laciniately incised. Ucluelet.

15. XANTHIUM (COCKLE-BUR)

Coarse annuals with broad, undivided, alternate leaves; the sterile flowers above, the fertile below, much as in *Ambrosia*, but the sterile, involucre bracts separate; fertile involucre 2-flowered, becoming a large burr clothed with long, hooked prickles. (Greek *xanthos*, yellow, one species furnished the Greeks with hair-dye).

1. *X. candense* Mill. Stem scabrous, 3-4 dm. high; leaves deltoid-ovate, dentate; body of fruit about 2 cm. long, ellipsoidal, glandular, the 2 beaks slightly incurved or straight; prickles hooked, about 100, spiculate-glandular on the lower half. Sand-hills, Penticton.

16. MADIA (TARWEED)

Glandular, heavy-scented herbs; leaves entire or toothed, at least some alternate; heads 1-many-flowered, radiate (rarely discoid); rays yellow; involuclral bracts in a single series, each enclosing an achene; receptacle chaffy; pappus none or scaly; achenes compressed laterally or 4 angled, glabrous. (*Madi*, the name in Chili).

Pappus of scales; perennials	1. <i>M. madioides</i> .
Pappus none; annuals.	
Disk flower 1, heads on filiform naked peduncles	2. <i>M. exigua</i> .
Disk flowers several.	
Heads congested, pubescence of leaves appressed	5. <i>M. glomerata</i> .
Heads racemously disposed pubescence of leaves not appressed.	
Disk achenes with a prominent lateral vein	3. <i>M. sativa</i> .
Disk achenes without a prominent lateral vein	4. <i>M. racemosa</i> .

1. *M. madioides* Nutt. Tall, 3-6 dm. high; leaves opposite below, the lower 4-8 cm. long, oblong-lanceolate, mostly entire, pubescent; heads mostly solitary at the ends of bracted branches; rays 8-12, often brownish. Woods, V. I. (*M. Nuttallii*).

2. *M. exigua* (Smith). Greene. Slender, 1-4 dm. high; leaves linear, hirsute, 1-3 cm. long; heads small, rays 3-8; involuclral bracts strongly lunate. Open woods V. I., Vancouver.

3. *M. sativa* Mol. Stem usually robust, 3-15 dm. high, glandular; leaves entire, linear to lanceolate; heads peduncled or sometimes congested at the ends of the branches; rays 5-12, broad, 3-toothed, 4-8 mm. long; disk achenes falcate, somewhat 4-angled by a strong rib. (*M. congesta*). Common, V. I. also in interior.

4. *M. racemosa* T. & G. Similar, not so stout, glandular above; leaves lanceolate, the heads racemously disposed on short peduncles along the branches; achenes flattish, not strongly veined. Same range.

5. *M. glomerata* Hook. Malodorous, glandular only at top, 3-6 dm. high, leaves linear to lanceolate; heads small, in close glomerules; rays usually not more than 5; achenes narrow, those of the disk 4-5-angled, the outer flat, 1 nerved on each side. V. I. and interior.

17. LAYIA

Low, pubescent, glandular annuals or biennials; leaves mostly opposite; heads about 2 cm. broad, rays white or yellow; involuclral bracts enclosing an achene; receptacle chaffy; pappus of 10-20 bristly or hairy awns.

1. *L. glandulosa* H. & A. Stems 1-3 dm. high, with black glands above; leaves linear-lanceolate, or the lower pinnatifid; heads solitary at ends of branches; rays white, 1 cm. long. Dry ground. D. I. (?)

18. BLEPHARIPAPPUS

Low annuals; leaves alternate; rays white or purplish; involuclral bracts in 1 series, about equal; receptacle convex, chaffy; achenes villous; pappus of 10-12 linear, mostly lacerate-fimbriate scales. (Greek *blepheron*, an eye-lash).

1. *B. scaber* Hook. Puberulent, 1-3 dm. high; leaves linear, 1-3 cm. long, entire, revolute; rays 3-6, inrolling in the sun; anthers brown. Dry plains, Kootenay.

19. HEMIZONELLA

Annual, leaves mostly opposite; heads much as in *Madia*, rays small, 4-5, very short, disk flowers 1-2; involuclral bracts enclosing an achene; chaff of the receptacle forming an herbaceous 3-5-toothed cup; achenes somewhat obcompressed. (Greek *hemi*, half, *zone*, a girdle, in allusion to the achenes).

1. **H. Durandii** Gray. White-hirsute, glandular above, 3-10 cm. high, diffusely branched; leaves linear, about 1 cm. long; heads in the forks or racemose, 2 bracted; achenes slightly pubescent, the outer with a short, inflexed beak. Dry hills, Sproat, southern B. C. to Cal.

20. RUDBECKIA (CONE-FLOWER)

Perennial or biennial, with alternate leaves and showy heads; rays neutral; involucre bracts foliaceous, spreading; receptacle conical, chaffy; achenes 4-angled, pappus none. (Rudbecki, father and son, Swedish botanists).

1. **R. hirta** L. (BLACK-EYED SUSAN). Biennial, bristly hairy, leaves nearly entire; rays orange. Introd.; Cowichan Valley.

21. COREOPSIS (TICKSEED)

Glabrous biennials, with more or less lobed leaves; heads radiate, long-peduncled; involucre in 2 series, united at base, receptacle flat, chaffy, achenes flat; pappus of 2 teeth. (Greek *koris*, a bag, *opsis*, aspect, in allusion to the achenes).

1. **C. Atkinsonia** Dougl. Stems 3-9 dm. high, branching; leaves opposite, the lower bipinnately parted, the upper trifoliate; bracts scarious margined, the inner much longer; rays 1.5 cm. long, yellow with a brown base, disk-flowers brown; achenes elliptical, winged. Along streams, eastern B. C. to Oregon; Osoyoos.

22. HELIANTHELLA

Characteristics of *Helianthus*; but the receptacle convex, the involucre in 2 series of narrow bracts, the achenes flat, more or less winged, and the pappus less deciduous. (dim. of *Helianthus*).

1. **H. Douglasii** T. & G. Stem hirsute; 3-9 dm. high; leaves oblong-lanceolate, nearly or quite sessile, 3-nerved, rough-pubescent; rays 2.5 cm. long; achenes obovate, more or less ciliate-fringed. Dry ground, Spence's Bridge and southw.

23. HELIANTHUS (SUNFLOWER)

Coarse annuals or perennials; leaves opposite or alternate, heads large, rays neutral; involucre green in several series; rays yellow, disk-flowers brown or yellow, pappus of 2 awns or scales, sometimes with intermediate ones, deciduous; receptacle chaffy; achenes somewhat flattened or 4-angled, embraced by the chaffy scales. (Greek *helios*, the sun, *anthos*, a flower).

Annuals; leaves mostly alternate; disk brown; receptacle flat.

Disk 1.5 cm. broad 1. *H. petiolaris*.

Disk 2.5 cm. broad or more 2. *H. annuus*.

Perennials; lower leaves usually opposite; disk yellow; receptacle convex.

Leaves mostly opposite; roots not thickened. 3. *H. pumilus*.

Leaves mostly alternate; roots fusiform 4. *H. Nuttallii*.

1. **H. petiolaris** Nutt. Stem simple or branched, 3-9 dm. high, more slender than the next; leaves rough, 2.5-8 cm. long, mostly entire, oblong or ovate-lanceolate. Eastward.

2. **H. annuus** L. (COMMON S.) Coarser, 6-18 dm. high; leaves 3-ribbed, broadly ovate, the lower cordate, serrate, involucre bracts ciliate. Waste ground; introd.

3. **H. pumilus** Nutt. Stems simple, 3-6 dm. high, hispid, bearing 5-7 pairs of leaves and a few heads; leaves ovate-lanceolate entire or nearly so, 4-10 cm. long; involucre about 12 mm. high, white hirsute, or hispid; bracts oblong-lanceolate. Reaching Field from the plains of the N. W.

4. **H. Nuttallii** T. & G. Stems simple below, branched above, about 1 m. high, glabrous, bearing numerous heads often with long peduncles; leaves narrowly oblong-lanceolate, the lower 7-15 cm. long; involucre 10-15 mm. high, white-ciliate on the margins, the tips often reflexed. Golden.

24. BALSAMORHIZA (BALSAM-ROOT*)

Low perennials, with thick roots and large basal leaves; heads very large, radiate, mostly solitary on a scape-like stem with a few small leaves; involucre foliaceous; achenes flattened parallel to the bracts, oblong, or the inner 4-angled; pappus none. (Greek *rhiza*, a root; the root is aromatic).

Leaves pinnately cleft.	1. <i>B. hirsuta</i> .
Leaves entire or dentate.	
Plant canescent.	2. <i>B. sagittata</i> .
Plants green.	3. <i>B. deltoidea</i> .

1. **B. hirsuta** Nutt. Rough hirsute, 2-3 dm. high; leaves pinnately parted or divided, the segments toothed or pinnatifid; the bracts of the involucre with ovate bases and long-attenuate tips. Dry plains, South Kootenay.

2. **B. sagittata** Nutt. White tomentose, 3-6 dm. high; stems numerous, usually 2-leaved; basal leaves twice as long as broad; involucre tomentose less foliaceous; rays 3-4 cm. long. Dry plains, Interior.

3. **B. deltoidea** Nutt. Green, pubescent, 3-6 dm. high, the numerous stems with a small leaf or two; basal leaves cordate, very broadly ovate, crenate-serrate or entire, the blade becoming 1-2 dm. broad, often almost as broad as long; involucre green; rays 3 or 4 cm. long. Victoria; Idaho.

25. WYETHIA

Perennial from a stout root; leaves alternate, mostly basal, large and entire; heads radiate, large; involucre bracts in 1-3 series, the outer often foliaceous; receptacle slightly convex, chaffy; pappus a crown with short teeth.

1. **W. amplexicaulis** Nutt. Glabrous, stems stout, 3-6 dm. high; basal leaves ample, the stem-leaves partly clasping; rays yellow, 2-4 cm. long. Wet places on the Boundary, Kootenay.

26. BIDENS (BUR MARIGOLD)

Leaves opposite, often divided; heads solitary or in corymbs; rays, when present, few, neutral; receptacle chaffy; involucre double, the outer foliaceous; achenes flattened parallel with the bracts of the involucre; pappus of 2-4 barbed awns. (Whence the name; *bi*, two, *dens*, a tooth).

Achenes 4-angled, 4 awned, heads soon nodding	1. <i>B. cernua</i> .
Achenes flat, heads erect.	
Leaves petioled; barbs of awns erect on lower half	2. <i>B. vulgata</i> .
Leaves sessile; barbs of awns retrorse or a few at very base erect.	
Outer involucre bracts 3-8 cm. long; awns of disk flowers 0-2	3. <i>B. amplissima</i> .
Outer involucre bracts shorter; awns of disk flowers 3-4	4. <i>B. dentata</i> .

1. **B. cernua** L. Smooth or hispidulous, 2-7 dm. high; leaves lanceolate acuminate, unequally serrate, connate at base; heads erect in flowering, soon nodding; outer involucre mostly longer than the head, rays, when present, one-half exceeding the disk; achenes 4-awned, 4-angled, retrorsely barbed, tuberculate on the angles; achenes 5-6 mm. long, twice as long as the 4 awns. Throughout North America, in many forms. Variable, a coast form is—

1a. **B. Macounii** Greene. Leaves not connate but sessile by an auriculate base; the outer involucre bracts hardly equaling the inner; rays neither numerous nor large; disk corollas with a short subglobose limb, one-third as long as the tube; achene compressed, but 4-angled, 3 times as long as the awns. New Westminster; Vancouver, in wet places.

2. **B. vulgata** Greene. Tall, branching, glabrous; leaves pinnately 3-5 divided; slender-petioled, coarsely serrate; outer involucre bracts 10-16, unequal, sometimes exceeding the disk, coarsely ciliate-hispid; rays usually present, pale-yellow, equaling the disk; tube of disk flowers shorter than the 4-5 toothed limb; achenes flat, 1-nerved on each face, 7.5-9 mm. long, 4.5-5 mm. broad, brown or olivaceous, awns 2, half the length of the achene. (The western form of *B. frondosa*). Kootenay.

3. **B. amplissima** Greene. Stem stout, obtusely angled, 9 dm. high, leaves except uppermost pinnately 3-parted, the segments incised, the floral simple, somewhat hispid-ciliate at base; bracts of outer involucre 3-8 cm. long, incised; rays 10 or more, comparatively small; disk corollas very short, surpassed by the awns, the limb longer than the tube; achenes compressed, 2-angled, some 3-angled; pappus of 1-2 awns or none; awns and olive-green achene retrorsely barbed. Soles River, V. I.

4. **B. dentata** (Nutt.) Wiegand. Stout, 4-10 dm. high, (depauperate forms low and slender, hardly showing rays, or rayless); leaves lanceolate, sessile (or in small forms more or less petioled) very coarsely and irregularly serrate, often 3-parted; rays pale or rich yellow, $\frac{1}{2}$ longer than the disk; disk-flowers deep yellow, the limb equaling the tube, the 5 teeth often with an intramarginal purple line running down the limb from the sinuses, bracts unequal, some of them usually exceeding the head, ciliate at base, scabrous at apex, as are also the upper leaves; achenes about 1 cm. long, 3 mm. broad, the outer shorter, flat, 1 ribbed on each side, awns retrorsely barbed, a few erect spicules at base, dark-brown, 4, 2 shorter, one small or obsolete, about $\frac{1}{2}$ the length of the achene. Low land, Lower Fraser; Elgin.

27. GAILLARDIA

Pubescent perennials; leaves alternate, entire to pinnately lobed; heads large, showy; disk-flowers brown or yellow, becoming brownish; bracts of involucre short-awned, broad, green, in 2-3 series; receptacle fimbriate; achenes 5-ribbed, villous; pappus of scales. (Gaillard was a French botanist).

1. **G. aristata** Pursh. About 4 dm. high; rays 1.5 cm. long, broad, deeply 3-lobed, yellow, usually purplish at base; disk-corollas pubescent; pappus-scales aristate. Dry places. Interior.

28. BAERIA

Low, leaves opposite, sessile; heads slender-peduncled, many-flowered, rays yellow, 5-15 conspicuous, yellow; bracts of involucre separate; receptacle subulate to conical; disk-corollas with a slender tube equaling the campanulate limb; achenes clavate-linear; pappus a few scales, or wanting. (Baer was a Russian botanist).

1. **B. maritima** Gray. Rather succulent, 1-2 dm. high; plants slightly arachnoid; leaves narrowly oblong or spatulate, entire or irregularly toothed or lobed; rays few and short or exceeding the bracts which are few, oblong-elliptical, obtuse, ciliate; heads short-peduncled, 12-15 mm. broad, pappus of erose chaff and bristly awns; disk-flowers glandular on the tube; achenes hirsute. Barclay Sound; Triangle Is. (Dr. Newcombe). Only other known station the Fallarone Is. off San Francisco.

29. ERIOPHYLLUM (WOOLLY SUNFLOWER)

Perennial, floccose; leaves alternate or partly opposite; heads peduncled; rays yellow or none; involucre bracts obtuse, woolly, united below; disk-flowers with a short tube; pappus a few scales. (Greek *erion*, wool, *phyllon* a leaf).

1. **E. lanatum** (Pursh.) Forbes. Tufted, 1.5-6 dm. high; leaves lobed or pinnately parted, the upper surface becoming green; rays 10-15 mm. long; achenes glabrous. (*E. caespitosum* Dougl.) Common, open places, Coast Region.

30. CHÆNACTIS

Low perennials; leaves pinnately dissected; heads peduncled, rayless, solitary or cymose; receptacle flat, involucre bracts subequal, linear; pappus, of erose scales; achenes pubescent. (Greek *chainein*, to yawn, *aktis*, a ray, in allusion to the broad rays).

1. *C. Douglasii* H. & A. Canescent, 1-4 dm. high; leaves alternate, bipinnate, oblong in outline; heads about 1.5 cm. long; disk-corollas whitish or flesh-colored; stamens exserted. Plains, Princeton, eastward.

31. HELENIUM (SNEEZEWEED)

Leaves alternate, resinous, entire or dentate; heads large, peduncled; involucre bracts linear to subulate reflexed; receptacle globose; ray- and disk-flowers yellow; pappus chaffy, pointed; achenes hairy on the ribs. (Greek Helenus, son of Priam).

1. *H. autumnale* L. Perennial, 4-9 dm. high; leaves usually entire lanceolate, strongly decurrent; rays reflexed, 1 cm. long, pubescent above; disk-flowers pubescent. Wet ground, common; V. I.; Cloverdale and eastw.

32. ACHILLEA (YARROW)

Perennials; the small corymbose heads many-flowered, the rays few, white (or rose), fertile; bracts of involucre scarious-margined, in several series; receptacle chaffy; achenes flattened, margined; pappus none. (Achilles is said to have discovered its virtues).

Leaves pinnatifid 1. *A. multiflora*.

Leaves bi-, or tri-pinnate. 2. *A. borealis*.

Rays 10 or more, heads 6-7 mm. high

Rays 5-10, heads 4-5 mm. high.

Leaves green, with short hairs, the segments spreading, the rachis wing-margined 3. *A. millefolium*.

Leaves somewhat hoary with longer hairs, the segments ascending, the rachis not wing-margined 4. *A. lanulosa*.

1. *A. multiflora* Hook. Leaves long-lanceolate, sharply pinnatifid-serrate with serrulate teeth, becoming glabrous; corymbs dense, compressed, rays very short. Northern B. C.

2. *A. borealis* Bong. Rarely exceeding 4 dm., stem and leaves usually more or less lanate; leaves bipinnate, the rachis hardly wing-margined, the segments crowded, the alternate divisions minute; rays white or pink, 3-5 mm. long; involucre bracts with a conspicuous dark margin, the inner acute. Alaska to Mexico; Uclulet. Easily distinguished by its remarkably handsome heads, in very convex corymbs, 2-6 cm. broad.

3. *A. millefolium* L. Stem simple to the inflorescence, 3-12 dm. high; cobwebby or nearly smooth; stem-leaves numerous, smooth or pubescent, thin, bipinnatifid, the segments flatter, not so crowded as in the next, and more spreading; corymb white or red, generally flat-topped; rays roundish, 2-3 mm. long, bracts pale, or the upper brown-margined; achenes scarcely margined. Common.

4. *A. lanulosa* Nutt. Frequently regarded as a var. of the above; leaves silky-lanate, the segments more crowded, and shorter, ascending; bracts stramineous with greenish keels and brown margins; rays 2.5-4 mm. long; achenes elliptical, more broadly margined. Common.

33. ANTHEMIS (CHAMOMILE)

Annuals or perennials with alternate, dissected leaves, and large, peduncled heads; rays white or yellow; involucre bracts scarious, in several series; receptacle conical, chaffy; pappus none, or a small crown; achenes glabrous, terete or ribbed. (The ancient Greek name).

1. *A. cotula* L. (MAYWEED). Ill-scented annual; leaves 3-pinnate, usually glabrous; rays white, neutral; receptacle without chaff near the margin; achenes roughened. Introd.; common.

2. *A. arvensis* L. (FIELD C.) Similar; not ill-scented; the ultimate divisions of the leaves broader; whole receptacle chaffy; rays white, fertile; achenes smooth on the sides. Introd., coast cities.

3. *A. tinctoria* L. (YELLOW C.) Canescent perennial, rays yellow; leaves pinnate; heads long-peduncled; pappus a crown. Introd., not common; Okanagan.

34. CHRYSANTHEMUM

Perennial, rays white, fertile; involuclral bracts scarious-margined, in 2-3 series, the outer shorter; receptacle flat or convex, naked; disk-corollas with a flattened tube; heads solitary and long-peduncled, or corymbose. (Greek *chrysos*, golden, *anthos*, a flower).

1. *C. leucanthemum* L. (OX-EYE DAISY). Simple or forking; basal leaves spatulate-obovate, crenate dentate, tapering to a petiole; heads solitary, long-peduncled; involuclral bracts oblong, a brown line between the scarious margin and the green centre. Introd. Var. *pinnatifidum* L. & L. Basal leaves pinnatifid or coarsely toothed; apparently the common form at the coast. *C. arcticum* L. Similar; leaves rather fleshy, cuneate-spatulate; irregularly toothed. Occurs as far south as Observatory Inlet.

2. *C. parthenium* (L.) Bernh. (FEVERFEW). Branching; leaves bipinnately divided; heads small in corymbs. An occasional garden escape.

35. ARTEMISIA (SAGEBRUSH)

Aromatic herbs or shrubs; leaves alternate; heads rayless, many-flowered; the outer flowers pistillate, and the inner perfect, or, more usually, all the flowers perfect, but not all fertile; involuclral bracts in several series; receptacle naked or pubescent; pappus none.

Shrubs, flowers all alike, perfect.

Leaves 3-toothed at apex

Leaves with 3 long, linear lobes

Herbaceous, often with a shrubby base, flowers of 2 kinds, the marginal pistillate, the inner perfect.

Leaves green on both sides, glabrous or nearly so.

Heads 8-10 mm. broad

Heads smaller.

Leaf divisions serrate

Leaves entire, or with entire lobes.

Leaves dissected

Leaves entire, or the lower 3-lobed

Leaves pubescent, often silky or silvery.

Heads 8-10 mm. broad

Heads 2-5 mm. broad.

Receptacle woolly or pubescent.

Leaf-segments filiform, leaves small

Leaf-segments oblong, leaves large

Receptacle naked, leaf segments linear to filiform.

Bracts of involucre green

Bracts of involucre brownish

Leaves tomentose, at least beneath.

Leaves green or glabrate on the upper surface.

Leaves pinnatifid, or bipinnate.

Leaves oblanceolate

Leaves broader.

Leaf-segments narrow

Leaf-segments broad

Leaves entire at least above, or merely toothed.

Involucre broadly campanulate.

Plants about 1 m. high, involucre green

Plants 3-6 dm. high, involucre slightly fuscous.

Involucre cylindrical

Leaves tomentose on both surfaces.

Leaves entire, or the lower merely toothed

Lower leaves lobed

1. *A. tridentata*.

2. *A. trifida*.

7. *A. longepedunculata*.

3. *A. biennis*.

5. *A. canadensis*.

4. *A. dracunculoides*.

7. *A. longepedunculata*.

8. *A. frigida*.

10. *A. Absinthium*.

5. *A. canadensis*.

6. *A. borealis*.

13. *A. ludoviciana*.

9. *A. discolor*.

12. *A. vulgaris*.

15. *A. Tilesii*.

16. *A. Lindleyana*.

11. *A. heterophylla*.

14. *A. gnaphalodes*.

13. *A. ludoviciana*.

1. **A. tridentata** Nutt. Shrub, 0.5-3 m. high; leaves cuneate, 3-4 cm. long, silky-canescens; heads in large, loose panicles, small, 5-8-flowered; involucre tomentose, the bracts ovate, obtuse. Common, dry plains of the interior.

2. **A. trifida** Nutt. Shrub, 2-15 dm. high; leaves 3-cleft towards the apex, or 3-parted, the lobes spatulate-linear, or the upper entire; panicle dense, leafy; involucre 5-9-flowered, the outer bracts linear-lanceolate. Dry plains of the interior.

3. **A. biennis** Willd. Annual or biennial, 3-9 dm. high, glabrous; lower leaves 2-pinnately parted, the upper pinnatifid, 2.5-6 cm. long; heads 3 mm. broad, in short axillary spikes or clusters; flowers all fertile. Introd., along railways; native northw.

4. **A. dracunculoides** Pursh. Tall, 1 m. high glabrous or somewhat pubescent, leaves narrowly linear, entire or the lower 3-cleft; heads nodding, 2-3 mm. broad, in a large, leafy panicle; receptacle smooth, disk-flowers perfect, sterile. Okanagan.

5. **A. canadensis** Michx. Glabrous or silky, 3-6 dm. high; the lower leaves bipinnate, the upper 3-7 divided, the divisions linear; heads 4-5 mm. broad, in panicles, involucre green; receptacle smooth, the central perfect, sterile. Atlantic to Pacific.

6. **A. borealis** Pall. Similar, usually silky, 1-3 dm. high; lower leaves 1-2 ternately or pinnately divided into linear lobes, the upper linear entire or 3-parted; heads 4 mm. broad, fewer in a narrow panicle; involucre brownish. (*a. spithamea*). Alaska to Colorado in the mts.

7. **A. longepedunculata** Rud. Rather stout, 1-5 dm. high; pubescent to glabrate; leaves bipinnatifid the segments oblong to linear or lanceolate; heads large, loosely racemose or racemose paniculate, nearly sessile to pedunculate, nodding; bracts of involucre brown-margined; inner flowers fertile. (*A. saxicola* Rydb., *A. norvegica* Gray., *A. lævigata* Standley). Arctic and subalpine, southward in the Rockies; Mt. Garibaldi.

8. **A. frigida** Willd. (PASTURE WORMWOOD). Stout, tufted, silky-canescens, 2-4 dm. high; simple or branching; leaves 1-2 cm. long, dissected into filiform crowded segments with usually stipule-like divisions at the base of the petiole; heads nodding, 3-4 mm. broad; involucre canescens, the outer bracts narrow; inner flowers fertile. Dry hills, Rockies.

9. **A. discolor** Dougl. (GREEN W.) Slender, tufted, 2-5 dm. high; leaves 3-4 cm. long, 1-2 pinnately divided into oblong segments, tomentose beneath, green or somewhat canescens above; heads erect, peduncled, in a long, narrow panicle; involucre lightly tomentose, but greenish, campanulate, 4 mm. broad; all the flowers fertile. Lytton, eastw.

10. **A. Absinthium** L. (WORMWOOD). Rather shrubby, 6 dm. high; silky, leaves 5-12 cm. long, ovate in outline, 2-3 pinnately parted into oblong, not at all crowded, segments; heads short-peduncled, nodding, panicked; all flowers fertile. Introd. Moodyville.

11. **A. heterophylla** Nutt. Stout, 1-1.5 m. high, simple; leaves broadly oblanceolate, coarsely toothed, tomentose beneath, green above, heads erect in large, naked panicles; involucre pubescent, but green, the lower bracts obtuse; all flowers fertile. Clay cliffs, Coast. (*A. vulgaris Californica*).

12. **A. vulgaris** L. (MUGWORT). Tall, leaves green, glabrate above, tomentose beneath; pinnatifid, the segments broad, entire or toothed, a pair of small, stipule-like divisions at the base of the petiole; heads small, in open panicles; receptacle smooth, all flowers fertile. Introd., Victoria.

13. **A. ludoviciana** Nutt. Stem stout, 3-5 dm. high, glabrate to tomentose; leaves 6-8 cm. long, tomentose beneath, more sparingly tomentose and greenish above, deeply 3-7 lobed, the lobes sharp and somewhat spreading, of the upper leaves entire; heads 3-4 mm. wide, glomerately paniculate

or spicate; involucre thinly tomentose; receptacle smooth, all the flowers fertile. Widely distributed. Coast Mts.; plains of interior; eastward to Manitoba. Very variable; of many forms the following is most marked.

14. **A. gnaphalodes** Nutt. Stems white, tomentose, usually much-branched; leaves lanceolate or oblong, usually less than 1 cm. wide, entire, or the lower somewhat toothed, tomentose on both sides; involucre densely tomentose; inflorescence often interrupted. V. I. eastward; Agassiz, and interior.

15. **A. Tilesii** Ledeb. About 1 m. high; leaves persistently tomentose beneath, smooth above, lanceolate-oblong, entire or more or less lancinately cleft; inflorescence paniced, the heads short-peduncled; involucre campanulate, green, smooth or nearly so, bracts scarious-margined; receptacle glabrous. Alaska to Oregon.

16. **A. Lindleyana** Bess. Slender, 3-6 dm. high; the thin flocculent tomentum soon deciduous except on the lower surface of the leaves; leaves 2-4 cm. long, linear-lanceolate, entire or the lower occasionally with 2 or 3 small lobes, slightly silky or glabrous above, thinly tomentose beneath; heads 4-5 mm. long, spicate on the usually simple stem; involucre campanulate, green, glabrate, pale-fusous. Chilcoten to Oregon.

36. MATRICARIA

Glabrous annuals or biennials, heads in ours rayless, bracts scarious; receptacle conical in fruit, naked; achenes wingless, ribbed; pappus a membranaceous crown or none; (*Mater*, mother, *carus*, dear, from medicinal virtues).

1. **M. suaveolens** (Pursh.) Buch. (PINE-APPLE WEED). Low, leaves much dissected, their odor when bruised that of pineapple; heads short-peduncled, with several rows of bracts much shorter than the disk; achenes terete, pappus none. (*M. discoidea*). Introd., common.

37. TANACETUM (TANSY)

Aromatic, perennial; leaves broad, alternate, dissected; heads rayless, many-flowered in a broad, flat corymb; the marginal flowers chiefly pistillate, terete; involucre scarious; receptacle convex, naked; achenes ribbed, with a large, flat top; pappus a short crown.

1. **T. vulgare** L. Glabrous, 6-9 dm. high; leaflets and wings of the rachis cut-toothed; heads numerous, hardly 1 cm. wide; pappus 5-lobed. Introd. Var. **crispum** DC. Leaves more cut and crisped. Introd. Moodyville.

2. **T. huronense** Hook. Woolly when young, 3-9 dm. high; heads fewer, 1-8, and larger, 12-18 mm. wide; pistillate flowers flattened; pappus toothed. Ucluelet.

38. COTULA (MUD-DISK)

Low marsh plants; heads 1 cm. broad, solitary, discoid; with a row of marginal pistillate, broader flowers; receptacle naked; achenes raised on short pedicles from which they are deciduous; involucre bracts ovate, green. (Greek *cotula*, a small cup).

1. **C. coronopifolia** L. Decumbent or slightly fleshy, glabrous; leaves with oblong-linear lobes, or entire above; heads about 8 mm. broad, on long, slender peduncles; achenes smooth on the convex, white-papillose on the somewhat concave, surface. Tidal flats, Mud Bay; V. I.

39. PETASITES (COLT'S FOOT)

Perennial, stemless, woolly herbs; the broad leaves (tomentose beneath) and scaly scapes from rootstocks; heads many-flowered, white or purplish, corymbose, the sub-sterile with a row of fertile ray-flowers and many tubular sterile ones; the flowers appearing in early spring before the leaves. (Greek *petasos*, a broad-brimmed hat, in allusion to the large leaves).

- Leaves orbicular, deeply 7-11-lobed 1. *P. speciosa*.
 Leaves triangular-ovate, 5-7-lobed 2. *P. frigida*.
 Leaves oblong-hastate, sinuate-denticulate to coarsely toothed or
 shallowly lobed 3. *P. sagittata*.

1. *P. speciosa* (Nutt.) Piper. Stout, 2-6 dm. high, bracts of stem broad or narrow; leaves reniform-orbicular, cleft beyond the middle, cordate, 0.8-3 dm. broad; heads many, bracts of involucre entire or erose-ciliate. Flowering early, along streams and damp banks, Coast; Selkirks. Var. *frigida* (Macoun). Leaves without a sinus at the base. Near perpetual snow. Rockies and Selkirks.

2. *P. frigida* (L.) Fries. (ALPINE C.) Stem 1-3 dm. high; bracts of scape broad; leaves triangular-ovate to oblong, 5-10 cm. long, usually longer than wide, 5-7-lobed, the lobes angularly lobed, extending $\frac{1}{3}$ - $\frac{2}{3}$ the distance to midrib, the basal sinus open; heads few, 13 mm. long, bracts of involucre erose-ciliate, acute. Alpine; Mt. Cheam; Rockies; Alaska.

3. *P. sagittata* Gray. About 3 dm. high, bracts of stem many, usually long or narrow, sometimes foliaceous; leaves longer than wide, deltoid-oblong, hastate, very coarsely toothed to repand-dentate, 0.8-1.5 dm. broad; heads many about 11 mm. long. East of Cascades; Field.

40. ARNICA

Perennial herbs, usually with opposite leaves; heads radiate or rayless, rays fertile; bracts of involucre in 1-2 series, subequal, herbaceous; receptacle flat, villous or fringed; achenes slender 5-10 ribbed or angled; pappus bristles rather rigid, in 1 whorl, barbillate.

- Heads rayless.
 Pappus tawny 1. *A. Parryi*.
 Pappus white 2. *A. discoidea*.
 Heads radiate.
 Pappus white or sordid.
 Lower stem or basal leaves cordate or ovate.
 Achenes more or less pubescent.
 Stems pubescent below.
 Pappus white, rays large.
 Leaves thin, the lower mostly strongly cordate and
 dentate 3. *A. cordifolia*.
 Leaves firm or thickish, the lower not cordate, mostly
 entire 4. *A. pumila*.
 Pappus sordid to nearly brown 16. *A. mollis*.
 Stems glabrous below, rays medium 5. *A. gracilis*.
 Achenes glabrous.
 Leaves more or less pubescent.
 Rays 15-18 mm. long deeply toothed 6. *A. latifolia*.
 Rays 12-mm. long slightly toothed 8. *A. aprica*.
 Leaves glabrous 7. *A. lævigata*.
 Lower leaves oblong or lanceolate.
 Stem-leaves not much reduced above.
 Low, 1-2 dm. high.
 Leaves glabrous or nearly so, except on the margins 9. *A. aurantiaca*.
 Leaves glandular-hairy on both sides 10. *A. louiseana*.
 Taller.
 Leaves densely pubescent, mostly entire 11. *A. foliosa*.
 Leaves slightly pubescent, dentate 12. *A. columbiana*.
 Stems with few or reduced leaves above; the heads on long
 peduncles.
 Lower leaves gradually tapering to petiole, 5-15 mm. wide.
 Leaves mostly entire 13. *A. fulgens*.
 Leaves mostly denticulate 14. *A. ———*.
 Lower leaves abruptly tapering to a petiole, 2-3 cm. wide 15. *A. alpina*.
 Pappus tawny.
 Stem-leaves ovate 16. *A. mollis*.
 Stem-leaves oblong to lanceolate. 15. *A. alpina*.
 Upper leaves few or reduced.
 Stem leafy, upper leaves little reduced.
 Lower leaves long-petioled 17. *A. Chamissonis*.
 Lower leaves sessile or short-petioled.
 Heads 3, involucre glandular 18. *A. amplexicaulis*.
 Heads many, involucre not glandular 19. *A. Macounii*.

1. *A. Parryi* Gray. Simple, slender, 2-5 dm. high, hirsute and glandular above; leaves usually denticulate ovate-oblong, rather abruptly contracted at base into a short, margined petiole; the cauline remote, narrower; achenes glabrous or nearly so. Rockies; Mt. Garibaldi.

2. *A. discoidea* Benth. Soft-pubescent, 3-5 dm. high; lower cauline leaves from ovate with truncate or abruptly cuneate base to cordate, petioled, the upper oblong-lanceolate; pappus white, achenes pubescent; allied to *A. cordifolia* and *A. pumila*. East of the Cascades.

3. *A. cordifolia* Hook. Pubescent, 3-6 dm. high (lower in alpine forms) stem leaves usually 2 pairs, petioled, or upper sessile, the lower pair strongly cordate, all rather thin; puberulent, coarsely dentate to entire, peduncles naked or with a few small bracts; heads 3 or the long peduncles naked or with small bracts, involucre pubescent, glandular, rays 3 cm. long; the barbellate pappus white, achenes 6-7 mm. long, pubescent. Common east of the Cascades.

4. *A. pumila* Rydb. Like a low form of the preceding, 1-2 dm. high, but sometimes much taller, with similar large heads; leaves thick, entire or denticulate, the blades shorter, usually under 4.5 cm., ovate, lightly cordate to subcordate, truncate, or even tapering. Crow's Nest Pass; at Armstrong flowering two weeks later than *A. cordifolia*, and with a longer flowering season. (E. Wilson).

5. *A. gracilis* Rydb. Stem slender, glabrous to the slightly glandular-pubescent inflorescence; basal leaves ovate, truncate or tapering at base, dentate, viscid-glandular above, glabrous or with a few scattered hairs; stem-leaves 1 or 2 pairs, similar; heads 1-several, of small or medium size, involucre about 6 mm. high, bracts glandular, not pubescent, achene glabrous on the lower half, pubescent and glandular above, or nearly glabrous; Mt. Revelstoke, Rockies. Dr. Greene considers the Revelstoke plant from which this description is mostly drawn, a distinct species.

6. *A. latifolia* Bong. More or less pubescent, 2-5 dm. high; basal sterile leaves sometimes sub-cordate, the blades 4-7 cm. long, long-petioled; cauline 2-4 pairs, (rarely in 3's), broad sessile, serrate, or the lowest petioled, heads usually 3 on long peduncles; bracts of involucre glandular, hairy; disk-corollas abruptly dilated at middle; pappus white, achenes glabrous. Alaska southward, in mts. and mt. valleys.

7. *A. lævigata* Greene. Very similar; leaves thin, glabrous, except on margins; involucre bracts more or less ciliate; disk corollas funnel-form. A common form; Mt. Cheam.

8. *A. aprica*. Greene. Similar to No. 6, more or less pubescent, smaller in all parts, heads more numerous, bracts of the turbinate involucre few, thin, oblanceolate, often purple-tipped; cauline leaves sessile, teeth callous-tipped; rays few, rather deep yellow, with 3 short, broad teeth, limb of disk corollas abruptly dilated; achenes glabrous except for a few hairs and glands about the summit. Mts., Chilliwack River. (*A. latifolia* in part). Glacier, Rockies.

9. *A. aurantiaca* Greene. Forming patches, 0.5-1.5 dm. high; leaves about three pairs, the lowest oblong, obtuse, the others broadly lanceolate, acute, entire, glabrous or nearly so, except the ciliate margins; peduncle minutely glandular, sparingly villous, bracts woolly at base; rays orange, pappus white, achenes silky-villous. Subalpine.

10. *A. louiseana* Farr. Slender, 1-2 dm. high; leaves entire or denticulate, glandular-hairy on both surfaces and on margins, the basal elliptical or obovate; heads 1-3, long-peduncled, nodding, rays 8-10, light yellow, about 12 mm. long, involucre densely glandular-hairy at base, brownish; pappus white. Loose stones, Mt. Fairview; Lake Louise.

11. **A. foliosa** Nutt. Stems 3-4 dm. high, leafy, leaves grayish or densely villous, mostly narrowly lanceolate, entire, or denticulate, not much reduced upwards, all but the upper much exceeding the short internodes; petioles slender, dilated at base and connate, the lowest forming a sheath; heads 1-several, if more than 3, somewhat racemose; bracts of involucre obtusish; rays 1 cm. long; achenes nearly glabrous. Rockies.

12. **A. columbiana** Greene. Similar; heads more numerous; leaves 8-12 cm. long, lanceolate, exceeding the nodes, more or less tapering to the base, and excepting the uppermost and somewhat spatulate pairs, short-petiolate; pubescence fine, the margins saliently dentate; bracts of involucre cuneate-ob lanceolate; disk corollas slender, the elongated teeth slightly bristly; pappus dull white. MacLennan River.

13. **A. fulgens** Pursh. Stem densely pubescent to villous above, 2-4, dm. high, from a horizontal rootstock, leaves few and reduced above, the lower narrowly lanceolate to spatulate or oblanceolate, mostly less than 1 cm. wide, strongly 3-nerved, tapering to a long petiole, usually entire; heads usually solitary, sometimes 3, long-peduncled, involucre campanulate, hirsute and glandular, rays orange, tube of disk corolla hirsute, sometimes glandular, the limb more or less pubescent, pappus dull white, achenes glandular with hirsute and soft pubescence mingled. Common, D. I. and Rockies.

14. **A. ———**. Stem with 2-3 pairs of lanceolate leaves, the upper pair distant and smaller, all more or less denticulate, the lower mostly more than 1 cm. broad, tapering gradually to the petiole; stem rather slightly pubescent, glandular above, heads 1-3, on long peduncles, turbinate-campanulate, rays 5-7 mm. broad, 3-toothed; disk-flowers pubescent; bracts glandular under the rather sparing pubescence, ciliate at apex; achenes glandular under the pubescence. Considered by Dr. Greene a new species, but his final report has not been received. Perhaps an extreme form of the preceding, known only from a single collection on Mt. Stephen.

15. **A. alpina** (L.) Olm. Similar in general appearance; stems from an enlarged rootstock; leaves oblong, lanceolate or the lower spatulate, 2 cm. wide or more, not 3-nerved from base, the lower tapering somewhat abruptly to a long petiole, rays pale yellow, pappus almost brown, achenes slightly glandular and hirsute; tube of disk-corolla pilose and glandular, limb naked. Cascades, Rockies. Has been referred to *A. pedunculata* Rydb, which has the base of the stem covered with red tomentum.

16. **A. mollis** Hook. Stems about 2-6 dm. high; glandular and crisp-pubescent; stem leaves 3-5 pairs, the upper ovate sessile, denticulate, the lowest obovate or oblanceolate on petioles, nearly as long as the blades; heads 1-5, the rays 2 cm. long, 6 mm. wide; achenes slightly hispid nearly as long as the subplumose, slightly brownish or sordid pappus. Mt. Cheam.

A. crocina Greene. Heads not at all glandular, pappus fuscous, lower leaves short-petiolate, is apparently related to this indefinite species. Chil-liwack Mts.

17. **A. Chamissonis** Less. Stem lightly or densely pubescent, to nearly smooth, 3-6 dm. high; leaves rather thin, hairy, oblong to oblong-lanceolate, dentate or denticulate, acute or obtuse, the lowest tapering into a margined petiole, the upper broad, and somewhat clasping at base, heads 1-several on hairy peduncles, bracts 8-10 mm. long, acuminate, glandular-hairy; rays 2-toothed, 12-15 mm. long; achenes with a few scattered hairs. Lower slopes of Selkirks and Rockies.

18. **A. amplexicaulis** Nutt. Glabrate to densely pubescent, about 3 dm. high; leaves in 4-7 sub-equal pairs, lanceolate (occasionally spatulate) denticulate, sessile by a more or less clasping base, the lower tapering to a short petiole; involucre and peduncles glandular, sometimes with gland-tipped hairs; heads 1-5, usually 3, rays medium, entire or toothed, disk-flowers with a hairy tube about equaling the glabrous limb, teeth some-

times slightly bristly; pappus brown, achene more or less pubescent, mts. and mt. valleys; Capilano; Clanwilliam. The leaves are sometimes much longer than the internodes, sometimes about equaling them, or shorter.

19. *A. Macounii* Greene. Taller, 6-9 dm. high, involucre not at all glandular, heads many, corolla tube shorter. Grading into the preceding. Comox, Chilliwack River, Revelstoke.

41. CROCIDIUM

Small annuals with yellow ray-flowers on scape-like stems; leaves alternate; bracts thin, herbaceous, receptacle conical; pappus-bristles very deciduous, in one row; achenes fusiform, rough, 3-5 ribbed. (Greek *krokis*, the nap of cloth, in allusion to the woolly axils).

1. *C. multicaule* Hook. Stems numerous, about 1 dm. high, plant woolly when young, becoming glabrate, but with woolly tufts in the axils of the spatulate-obovate few-toothed leaves. Grassy places, near Victoria.

42. SENECIO (GROUNDSEL, RAGWORT)

Perennial (sometimes annual) usually with a simple stem; leaves alternate; flowers yellow, rayless or radiate; involucre cylindrical or campanulate, simple or with a few bractlets at base; receptacle flat, naked; pappus of soft capillary bristles. (*L. senex*, an old man, in allusion to the white pappus).

Annuals, common weeds, rays short or none.

Outer involucre bracts black-tipped; low

Outer bracts wanting, or if present not black-tipped; tall

1. *S. vulgaris*.

2. *S. sylvaticus*.

Perennials.

Heads discoid.

Heads few, usually 1-4, often subsessile

3. *S. pauciflorus*.

Heads many, peduncled.

Basal leaves obovate

4. *S. idahoënsis*.

Basal leaves ovate

5. *S. discoideus*.

Heads radiate.

Heads 15-25 mm. high.

Lower (outer) bracts of involucre long

6. *S. megacephalus*.

Lower bracts of involucre short

7. *S. pseudo-arnica*.

Heads 6-12 mm. high.

Heads mostly solitary at ends of stem; plants low.

Basal leaves round-cordate

8. *S. Newcombii*.

Basal leaves not cordate.

Stems rather leafy; root much developed

9. *S. Fremontii*.

Stems scapose or with much reduced leaves

Leaves entire or 3-7- crenate toothed

10. *S. petrocallis*.

Leaves coarsely dentate.

Bracts linear, acute; rays 8-12

11. *S. subnudus*.

Bracts lanceolate, tapering from the middle, rays 12-15

12. *S. ovinus*.

Heads few to many; plants mostly tall.

Plants permanently white-tomentose

13. *S. canus*.

Plants glabrous or becoming glabrous or glabrate.

None of the leaves pinnatifid.

Stem very leafy, the leaves large, not much reduced upwards

14. *S. triangularis*.

Stem-leaves few or reduced above.

Bracts of involucre dark-tipped; tall plants. —

Involucre 6-8 mm. long.

Inflorescence rather dense

15. *S. lugens*.

Inflorescence open

16. *S. exaltatus*.

Involucre 10 mm. long

Bracts of involucre not black-tipped; or low plants.

Low, less than 2 dm. high.

Leaves 5-10 cm. long

18. *S. Elmeri*.

Leaves 7-14 mm. long

10. *S. petrocallis*.

Taller, leaves large.

Plant quite glabrous

19. *S. hydrophilus*.

Plants becoming glabrate.

Heads few, leaves 2-3 cm. broad

20. *S. integerrimus*.

Heads many, leaves 1 cm. broad

21. *S. fastigiatus*.

Some of the leaves pinnatifid.

Stem leafy, the leaves not much reduced upwards . . . 22. *S. eremophilus*.

Stem-leaves reduced upwards.

Basal leaves round-ovate or oblong, 1-2 times as long as broad.

Leaves few-several-toothed at apex. 23. *S. cymbalarioides*.

Leaves serrate or crenate nearly to base 24. *S. pseud aureus*.

Basal leaves oblong-lanceolate, more than twice as long as broad.

Leaves more or less floccose, at least beneath, or tardily glabrate.

Bracts about 12 21. *S. fastigiatus*.

Bracts about 20 25a. *S. Balsamitæ* var. Thomsoniensis.

Leaves glabrous or soon becoming so.

Heads 6-8 mm. high 25. *S. Balsamitæ*.

Heads 10-13 mm. high 26. *S. multinomensis*.

1. *S. vulgaris* L. (COMMON GROUNDSEL). Low, 1-4 dm. high, corymbosely branching, glabrate; leaves pinnatifid, toothed, 2-8 cm. long, usually woolly in the axils, the lower involucre bracts black-tipped, about 8 mm. long; rays none; achene pubescent. A common weed.

2. *S. sylvaticus* L. Tall, stout, leafy, 6-8 dm. high, viscid, pubescent, leaves pinnatifid, the segments toothed, those of the middle stem 1 dm. long; inflorescence ample, corymbose, naked; rays obscure, involucre about 6 mm. long, lower involucre bracts nearly absent, achene pubescent. A rapidly spreading weed, Vancouver.

3. *S. pauciflorus* Pursh. Glabrous or floccose in the axils; stem rather stout, 1-3 dm. high; basal leaves ovate to oblong, often with a few basal lobes, crenate; stem leaves few, pinnatifid; involucre 6-10 mm. long, the bracts oblong, purple or purplish, usually with some short, basal ones; heads rayless, or rays short. Labrador; Alaska southward to Wn. in the Rockies; Mt. Garibaldi. Hardly distinct from No. 5.

4. *S. idahoensis* Rydb. Stout, becoming glabrate, 4-5 dm. high, branching, purplish; basal leaves obovate, serrate, lower stem leaves oblanceolate in outline, about 1 dm. long, long petioled, the upper sessile, all bluish green, pinnately divided into incised segments; heads numerous, about 1 cm. high, bracts very narrowly linear, achenes striate, Glabrous. Chilliwack River.

5. *S. discoideus* (Hook.) Brit. Stems 2-8 dm. high; lower leaves broadly ovate, often purplish beneath, 1.5-8 cm. long, obtuse, crenate to dentate, abruptly contracted to the petiole; stem-leaves pinnatifid; heads discoid (or rays very short), often sub-umbellate; bracts of involucre 7 mm. long, linear often purple or purple-tipped, achenes glabrous; a discoid form allied to *S. pseud aureus*. Field; Bonnington Falls; Skeena Valley.

6. *S. megacephalus* Nutt. About 3 dm. high, loosely floccose, tardily glabrate, leafy; lower leaves entire, thickish, lanceolate, or the radical spatulate-lanceolate, tapering to the petiole; heads 1-3, short-peduncled, 15-25 mm. high; involucre with elongated basal bracts; rays 12 mm. or more long. Mts., Kootenay.

7. *S. pseudo-arnica* Less. Stout, 1-10 dm. high; loosely white-woolly, sometimes becoming glabrous, leafy above, often nearly naked below, leaves oblong-lanceolate to subovate, 6-15 cm. long, repand to entire; leaves large, 1.5-2 cm. high, 1-many, involucre subulate-bracted at base. Gravelly beaches, Alaska southward; West Coast, V. I.

8. *S. Newcombei* Greene. Low, 1.5 dm. high; leaves reniform-orbicular, cordate, with about 6 coarse mucronate teeth, or lobes, the blades 1.2-2.5 cm. broad, glabrous at maturity, the long petioles more or less pubescent; stem leaves sessile, cuneate, reduced above; head solitary, 1 cm. high, involucre glabrous or lanate at very base; calyculate bracts wanting; rays 1.5 cm. long, achenes glabrous. Queen Charlotte Islands.

9. *S. Fremontii* T. & G. Stems few to many, ascending, slender, from a woody base, and large woody root, 0.8-2 dm. high; more or less leafy, except on the upper third; the whole plant glabrous; except at the very base of the campanulate involucre; bracts glabrous, darker at base, leaves obovate, irregularly toothed, 2 cm. long; involucre darker at base, mostly purple-tipped, heads usually 1, 10-14 mm. high, rays light-yellow. Rockies; Mt. Garibaldi.

10. *S. petrocallis* Greene. Glabrous, or nearly glabrate; leaves orbicular-obovate to oval, or cuneate-oblong, 7-14 mm. long, entire or 3-7-crenate-toothed at the broad apex, abruptly petioled; scapes 3-10 cm. high, bearing solitary or several clustered heads, 8-10 mm. high; rays 6-10, 5-6 mm. long (*S. petraeus*) Alpine, Rockies.

11. *S. subnudus* DC. Glabrous; stems often decumbent at base, simple, 1-2.5 dm. high; from slender rootstocks, usually bearing one head; radical leaves obovate, slender-petioled, coarsely dentate; the cauline pinnatifid or bractlike; involucre turbinate, the bracts linear acute; rays 8-12; achenes glabrous, striate. (*S. aureus subnudus*). Wet ground. Mts., British Columbia to Wyoming (Macoun).

12. *S. ovinus* Greene. Tufted, dwarf, leaves 2.5 cm. high, the scapiform stem 5-10 cm. high; leaves thickish, suborbicular and petiolate to sub-spatulate, coarsely dentate, the petioles flocculent, at least when young; cauline leaves, when present, clasping, pectinate; head solitary at end of stem 8 mm. long, rays showy, 12-15, bracts of involucre lanceolate, tapering from near the middle. Sheep Mt.; Alberta to Washington.

13. *S. canus* Hook. Stems solitary or few in a tuft; white-tomentose, 1-3 dm. high; lower leaves ovate or oval petioled entire; upper leaves sessile entire or sometimes toothed; heads few to many, rays orange, about 1 cm. long, bracts sparingly tomentose to glabrate, no small lower ones present; achenes glabrous at least below. Spence's Bridge eastward. Field. Var. *Purshianus* (Nutt.) A. Nels. Tufted; leaves narrower, spatulate to linear. Rockies, Banff.

14. *S. triangularis* Hook. Glabrate, leafy to the top, 6-9 dm. high; lower stem leaves broadly triangular-lanceolate, cordate to truncate at base, 1 dm. long, sharply dentate, petiole 1.5-3 cm. long, the upper lanceolate, sessile; heads many, rarely solitary, on peduncles 2-3 cm. long, 10-15 mm. long, rays 6-12, 10-12 mm. long. Mts. throughout; Revelstoke.

15. *S. lugens* Rich. Stout 1.5-6 dm. high, stem and leaves usually still pubescent at flowering, lower leaves oblong-ob lanceolate to ovate, acute, denticulate, the petiole nearly as long as the blade; stem leaves soon much reduced; heads in a close corymb, rays 1 cm. long, or less; involucre campanulate, black-tipped, 6-8 mm. long; achenes black, pubescent or glabrous. Mts.; Alaska to Wn., Rockies; Boston Bar.

16. *S. exaltatus* Nutt. Similar, at length glabrous; leaves with a petiole equaling or longer than the blade, repand-denticulate, obtuse or acute; stem-leaves few, reduced; heads many in an open umbel, or corymb, the middle peduncle short; rays yellow, (or in *var. ochroleucus* (Gray). Howell. pale) 8-10 mm. long. Spence's Bridge eastward to Rockies; Arrowhead; Crow's Nest Pass.

17. *S. atriapiculatus* Rydb. Similar; stem more leafy on the lower half; pubescence becoming scanty, heads longer. (*S. columbianus*, Greene). Southern border, east of the Cascades.

18. *S. Elmeri* Piper. Tufted, 1.5 dm. high; the basal leaves short-petioled, obovate to broadly oblanceolate, rounded or pointed, denticulate to sharply dentate, some of them almost as long as the stems, floccose becoming glabrous; stem-leaves 2-3, not pinnatifid; stem terminating in 1-4 heads, 10-13 mm. high, involucre dark and floccose at base, the bracts lanceolate, scarious-margined, 7-12 in number, slightly or not at all black-tipped; rays light-

yellow, 1-1.5 cm. long; young achenes brown, apparently glabrous, but finely villous under a glass. Mt. Cheam.

19. *S. hydrophilus* Nutt. Glabrous, 5-15 dm. high; leaves thick, often glaucous, the radical oblanceolate, petioled, 1.5-3 dm. long, the upper reduced lanceolate sessile, all entire to denticulate; heads numerous; rays 3-6, small, sometimes wanting. In wet places, B. C. to Cal. (Howell). Interior.

20. *S. integerrimus* Nutt. Stout, 3-9 dm. high, becoming glabrate; leaves usually entire or sometimes sparingly denticulate, thickish, the basal large, short-petioled, heads many in an ample panicle; involucre nearly cylindrical, 8-10 mm. high, rays 8-12, linear-oblong, achenes nearly glabrous. Kootenay.

21. *S. fastigiatus* Nutt. Var. *Macounii* (Greene) Greenman. Stem 3-5 dm. high, in clusters, simple; more or less floccose throughout, becoming glabrate, though tardily so on the under surface of the leaves; basal leaves narrowly oblong-oblanceolate, 1-1.2 dm. long, entire to repand or denticulate; stem leaves small, linear and entire or pinnatifid; heads 1 cm. high, in small, rather compact to large, loose, cymose panicle; rays 1.5 cm. long, involucre bracts about 12; achenes glabrous, light-brown, angled. Dry hills, V. I.

22. *S. eremophilus* Rich. Branching, leafy to the top, 3-6 dm. high; glabrate; leaves large, thin, irregularly pinnatifid; heads many in an ample inflorescence, 8-10 mm. high; involucre freely bractate at base, the proper bracts brown or purple-tipped; rays 7-9, 4-6 mm. long; achenes hispid or glabrous. Dry interior to Sask.

23. *S. cymbalarioides* Nutt. Stems and leaves glabrous or nearly so; 2-3 dm. high; lower leaves thick, obovate, tapering to narrow petioles, longer than the blade, crenate-serrate above the middle to few toothed and entire, stem-leaves small, more or less pinnatifid; heads several to many in a close corymb; bracts of involucre rather broad, often penicillate, obtuse, rays sometimes orange; achenes angled, glabrous. (*S. aureus borealis*). Alaska southward in Mts. to Colorado; Crow's Nest Pass. *S. crocatus* Rydb. (*S. aureus croceus* Gray). May be distinguished from this by the broad pinnatifid somewhat auricle-like bases of the petioles of the stem-leaves. Rockies; Crow's Nest Pass; Kicking Horse Lake. *S. mutabilis* Greene. (*S. aureus compactus* Gray). Similar; low, 1-3 dm. high, somewhat tufted; basal leaves round-obovate to spatulate often 3-toothed, the cauline nearly entire, heads close and few to many. Crow's Nest Pass; Cariboo Road.

24. *S. pseudoreus* Rydb. Glabrous except the tips of the bracts and the bases of the petioles; 5-8 dm. high, from a creeping rootstock; basal leaves ovate-oblong, subcordate, truncate, or tapering at base, serrate-crenate, the blades 2-5 cm. long, long petioled; stem-leaves more or less pinnatifid, bracts 6-8 mm. long; heads about 8-11 mm. high, in a flat-topped corymb; bracts green or purple-tipped, 5-6 mm. long; rays orange, about 8-9 mm. long; achenes glabrous. The western form of *S. aureus*. Rockies Kootenay. *S. obovatus* Muhl. Similar; basal leaves roundish-obovate to oblong-spatulate tapering to a winged petiole. (*S. aureus obovatus* T.&G.) Chilcoten.

25. *S. Balsamitæ* Muhl. Yellowish-green; 4-6 dm. high; becoming glabrous or remaining floccose in the axils; basal leaves obovate to oblong lanceolate, the blades crenate or serrate, 2-6 cm. long, usually tapering to a longer petiole; lower stem-leaves pinnatifid-lyrate, petioled, upper pinnatifid, sessile, inflorescence cymose-corymbose; rays (sometimes wanting) 8 mm. long; bracts very narrow, penicillate, achenes glabrous or pubescent. Atlantic to Pacific, common east of the Cascades. Var. *thomsoniensis* Greenm. A rather more slender plant, often with more reduced stem leaves; more floccose, tardily glabrate. Thompson River; Penticton.

26. *S. multnomensis* Greenm. Similar, stem more or less flexuous, 3-7 dm. high, floccose at base and in leaf axils or glabrous, stem-leaves much as in *S. Balsamita*, the lobes more remote, heads larger, 10-13 mm. high, involucre campanulate, glabrous or floccose, tip penicillate; rays 8-9 mm. long. Armstrong; Banff.

43. TETRADYMIA

Low shrubs with alternate or fascicled narrow leaves, and yellow, discoid, cymose heads, receptacle flat; involucre bracts 4-6; achenes terete; pappus copious, white, capillary; style-branches minutely penicillate. (Greek, tetradymos, fourfold; some species have four flowers).

1. *T. canescens* DC. Hoary, 3-6 dm. high; leaves linear to spatulate-lanceolate, about 1.5 cm. long; longer and broader below the inflorescence; heads 18 mm. high, mostly short-peduncled; achenes short, villous. Resembling *Bigelovia* with which it occurs. Kamloops; Okanagan.

44. LUINA

Leaves alternate, entire, heads rayless, creamy; involucre a single series of dry bracts; pappus of white bristles; achenes pubescent, striate; receptacle flat. (An anagram of *Inula*).

1. *L. hypoleuca* Benth. In clumps 3-6 dm. high; stems and under surface of leaves white-tomentose, leaves oval, sessile, green above, flowers 10-20, in corymbose heads. A beautiful mt. plant. Cascades; Coast Range; and V. I.

45. ADENOCAULON

Stem not tomentose, glandular above, leaves broadly deltoid, green above, white-tomentose beneath; heads small, in a large, very open panicle; involucre bracts few, green; corolla white; the fertile flowers marginal, the central flowers perfect, but sterile; style not lobed; achenes large, glandular at apex. (Greek *aden*, a gland, *kaulos*, a stem).

1. *A. bicolor* Hook. (SILVER-GREEN). Stems 3-9 dm. high, leaves mostly near the base; the few mature achenes clavate, glandular at apex, extending radially. Open woods; common.

46. PSILOCARPUS

Low, woolly annuals with mostly opposite leaves; heads with few small involucre bracts, many pistillate flowers each enclosed in an inflated hairy bract, and a few central, perfect, but sterile flowers in the centre; pappus none; the terminal heads subtended by a whorl of leafy bracts. (Greek *psilos*, naked, *karphos*, a small dry body, in allusion to the naked achene).

1. *P. elatior* Gray. Erect, 1-1.5 dm. high, slender, the stem sparingly woolly; leaves oblong-spatulate 1-2 cm. long; achene smooth, cylindrical. Damp ground, with *Gnaphalium palustre*, Sidney, V. I.

47. ANTENNARIA (EVERLASTING)

Perennial, woolly white herbs with diœcious or polygamo-diœcious, whitish flowers, which are all tubular and small; the inflorescence dry and scarios, white, brownish or rose, the most striking part of the head; the pistillate corolla very slender, style 2-cleft; the staminate with a tubular corolla, style with undivided apex, and the pappus usually dilated at the apex; pappus, a single series of capillary bristles, in the fertile flowers slender and united at base; the staminate plants are smaller, often not so abundant as the pistillate or even wanting. (The white sterile pappus suggests the antennæ of certain insects).

- Heads solitary, hardly raised above the tufted foliage; pappus of the staminate head not enlarged at tip**
- Heads several, pappus of the staminate heads more or less dilated at tip.**
- Plants producing leafy stolons, and thus more or less matted.
- Leaves at length green and glabrous above.
- Bracts pinkish 3. *A. erigeroides*.
- Bracts not pinkish.
- Heads few in a dense cluster.
- Lower leaves less than 2 cm. long.
- Bracts brown-tipped 4. *A. Macounii*.
- Bracts green-tipped 5. *A. chlorantha*.
- Lower leaves usually more than 2.5 cm. long, bracts white-tipped 2. *A. Howellii*.
- Heads several to many in an open inflorescence.
- Stem sparsely leafy, inflorescence glandular 6. *A. racemosa*.
- Stem leafy, inflorescence not glandular 7. *A. eximia*.
- Leaves white-tomentose on both sides.
- Pappus of staminate heads enlarged about the middle, not at all clavate at the tip 10. *A. pulvinata*.
- Pappus of staminate heads enlarged at the tip.
- Bracts blackish-green at tip, the inner acute on pistillate heads 8. *A. media*.
- Bracts brown at tip, the inner obtuse 9. *A. umbrinella*.
- Bracts whitish at tip 11. *A. parvifolia*.
- Bracts pink 12. *A. rosea*.
- Plants not producing stolons and thus not matted.
- Heads 4-5 mm. high.
- Leaves oblanceolate or spatulate; the inner bracts of pistillate heads acutish 13. *A. oblanceolata*.
- Leaves linear to narrowly lanceolate; inner bracts of the pistillate heads obtuse 14. *A. luzuloides*.
- Heads 6-10 mm. high.
- Basal leaves 6 cm. long or less, not nerved; plants alpine 15. *A. lanata*.
- Basal leaves 1 dm. long or more, nerved; plants not distinctively alpine.
- Bracts with a large dark spot, those of the pistillate heads acute 16. *A. pulcherrima*.
- Bracts with a small brown spot or none, those of the pistillate heads obtuse 17. *A. anaphaloides*.
- 1. *A. dimorpha* T. & G.** Tufted, 2-5 cm. high, leaves narrowly oblanceolate and acute to spatulate, 1-2.5 cm. long, tomentose on both sides; heads solitary; outer bracts of the staminate ovate, obtuse, the inner acute; of the pistillate lanceolate acuminate; pappus not dilated in the staminate flowers. Dry plains, Lytton eastward.
- 2. *A. Howellii* Greene.** Stems slender, 1.5-4 dm. high, leafy, with reduced erect linear-oblong leaves, producing of sets very freely; basal leaves spatulate-obovate, obtuse narrowed to a short petiole, soon becoming glabrous above; inflorescence capitate, heads 6 mm. long, bracts tomentose at base, with white, obtuse acute tips. Dry plains, V. I. and Coast to Kootenay; Bowen Is.
- 3. *A. erigeroides* Greene.** Slender, but rather rigid and wiry, the flowering stems 2-3 dm. high; stolons with small foliage narrowly spatulate-oblanceolate, compactly silky-lanate on both faces, the upper glabrate only on age; stem-leaves narrowly linear-falcate, sharply acuminate, all but the upper curving away from the stem; heads distinctly racemose, a few at the very summit only more crowded and subcymose; lower pedicels filiform, 12-25 cm. long, suberect; scarious tips of the involucre bracts all obtuse, pinkish; staminate plant not known. Skagit Valley.
- 4. *A. Macounii* Greene.** Low and slender, stolons 4 cm. long; the obovate-spatulate thinnish leaves white-tomentose when growing and equally so on both faces, but the second year green and glabrate; stems 5-8 cm. high, with a few narrow acuminate leaves; heads 2-5 subsessile; bracts few, woolly at base, their naked tips brownish, oblong-linear, obtuse or acutish. Revelstoke. Somewhat similar specimens from Mt. Cheam are doubtfully referred to ***A. tomentilla* E. Nels.** About 1 dm. high, bracts more or less erose, with a dark spot in the centre, brownish-green tipped.

5. *A. chlorantha* Greene. Loosely tufted, about 1 dm. high, the short stolons not densely leafy; basal leaves cuneate-obovate to obovate-spatulate, acutish and mucronulate, green above in the second year, glabrate below, the largest about 2.5 cm. long; the subsessile heads about 5; bracts of the involucre of the pistillate heads with long, deep-green scarious tips elongated and mostly acute, the innermost acuminate. Chilliwack Mts.; Mt. Benson and Strathcona Park, V. I.

6. *A. racemosa* Hook. Stem slender, pubescent, 1-4 dm. high, its 4-6 leaves oblong-lanceolate; stolons not densely leafy; the lower leaves elliptical or obovate or oblanceolate, obtuse or acute, mucronate, minutely whitish-punctulate, glabrous above, loosely tomentose beneath, becoming glabrate the second year, 2-5 cm. long; heads 8 mm. long, more or less racemose, mostly on long peduncles; the bracts of pistillate head greenish, tinged with brown, or sometimes with pink, arachnoid, the lower obtuse, the upper acute. Plains and dry woods, Lytton, eastward.

7. *A. eximia* Greene. Stems stoutish, 3 dm. high, more or less; basal stolons short, densely leafy, their leaves about 2.5 cm long, narrowly obovate-cuneiform, otherwise much as in *A. racemosa*; stem-leaves many, approximate; heads many and large, forming an ample compound corymb, 4-5 cm. broad; outer bracts of involucre arachnoid-woolly, greenish with short, scarious obtuse tips or none; the inner acute or acuminate; male plant unknown. Dry woods, Skagit Valley; Mt. Benson, V. I.

8. *A. media* Greene. Tufted, 5-10 cm. high, stolons 1-3 cm. long; basal leaves obovate or spatulate, 8-20 cm. long, densely tomentose; stem-leaves several, narrow; pistillate heads densely clustered 5-6 mm. high, their inner bracts lanceolate; staminate heads looser, their bracts obtuse. Mts., Cheam to Rockies. *A. acuta* Rydb. is very similar; basal leaves narrower (3-4 mm. broad), greenish white, glabrate in age. Lake O'Hara, Rockies.

9. *A. umbrinella* Rydb. Similar, 8-20 cm. high, stolons 1-4 cm. long, often erect; bracts of both kinds of heads oblong or oval and obtuse; brown or lighter at the tips. (*A. mucronata* E. Nels.) Common, Spence's Bridge eastward.

10. *A. pulvinata* Greene. Differs in the darker brown bracts and in the pappus of the staminate-head enlarged at the middle, not at the tip. Kicking Horse Lake, Rockies.

11. *A. parvifolia* Nutt. Slender, densely matted, 1-3.5 dm. high, stolons short, spreading, leaves spatulate-oblanceolate, to obovate, 1-2 cm. long, often acutish, sometimes showing green on the upper surface through the pubescence; heads 6-8 mm. high, in a dense cluster, or rather loose, bracts of pistillate heads mostly narrow at tip, obtuse or acute, sometimes with a brown spot in the middle; the staminate oblong obtuse, all dull-white or yellowish. (*A. aprica* Greene). Common, D. I.

12. *A. rosea* Greene. Slender, 2-4 dm. high, stolons ascending or erect, foliage slightly viscid, lower leaves spatulate to narrowly oblanceolate, acute, 2 cm. long, stem-leaves longer, heads in compact clusters, tips of the involucre bracts obovate obtuse; staminate plant unknown. Very common in D. I. and on mts.

13. *A. oblanceolata* Rydb. Slender, simple, 1-2.5 dm. high, lower leaves oblanceolate-spatulate, 3-nerved, tomentose, 5-10 cm. long, heads 4-5 mm. high, in a small corymb, bracts scarious to base, tomentose at very base, brownish or greenish, only the inner with white tips, obtuse in the staminate, acute in the pistillate heads; pappus much dilated. Dry plains, Kootenay; Rockies.

14. *A. luzuloides* T. & G. Slender, 2-3 dm. high, leaves very narrowly lanceolate to linear; heads 4-5 mm. long, involucre glabrous nearly or quite to the base; achenes glandular, pappus almost petaloid. D. I.; Spence's Bridge; Columbia Valley.

15. **A. lanata** Greene. Densely white-woolly, 0.5-1.5 dm. high; the lower leaves spatulate-ob lanceolate, 3-6 cm. long, the upper, linear-oblong with small scarious tips; inflorescence close; involucral bracts woolly, on lower half, the inner with white, the outer with green or yellowish lips, the staminate bracts much broader than the pistillate; achenes glabrous; pappus of staminate flowers moderately dilated. Alpine; Cascades; Rockies.

16. **A. pulcherrima** (Hook.) Greene. Simple 1.5-4 dm. high; lower leaves oblanceolate, about 10 cm. long, 3-nerved, tomentose; heads 6-8 mm. long in a dense or open cluster; bracts brownish, or whitish, in 6-7 series, the inner ones of the pistillate heads narrow, acute. Rockies; Field; Roger's Pass.

17. **A. anaphaloides** Rydb. Similar; basal leaves more than 1 dm. long, strongly 3-5-nerved, lightly tomentose; bracts sometimes slightly pinkish, usually white and papery above the middle, in 3-5 rows, obtuse in both the staminate and the pistillate heads. Common, D. I.; Summerland.

48. ANAPHALIS (PEARLY EVERLASTING)

Much as in *Antennaria*, but the pappus of the sterile flowers is not thickened at the summit, and that of the fertile flowers not at all united at the base; heads small in a corymbose cluster; style not lobed.

1. **A. margaritacea** Beuth. Stem white-silky, 3-9 dm. high; leaves alternate, tomentose beneath, green above, lanceolate, 3-nerved. Common, Alaska to Cal. Var. **subalpina** Gray. Leaves more lanose, heads fewer in a more contracted corymb. Rockies.

49. GNAPHALIUM (CUDWEED)

Woolly herbs with alternate leaves, heads all alike, the outer pistillate slender, the central perfect; involucre bracts dry, scarious; pappus a single row of rough bristles. (Greek *knaphalon*, a lock of wool).

Pappus united at base, leaves becoming green on the upper side . . . 1. *G. purpureum*.
Pappus distinct.

Leaves green and glandular above.

Stems densely white-woolly-pubescent above . . . 3. *G. Macounii*.

Stems not densely white-woolly-pubescent above . . . 2. *G. decurrens*.

Leaves tomentose not glandular.

Involucral bracts brown or brown-tipped with white, plants low.

Branches spreading . . . 4. *G. uliginosum*.

Branches erect . . . 5. *G. palustre*.

Involucral bracts white or yellowish; plants taller.

Inflorescence open . . . 6. *G. microcephalum*.

Inflorescence dense, or heads in dense clusters . . . 7. *G. chilense*.

1. **G. purpureum** L. Rather stout, erect, 1.5-4 dm. high; leaves broadly spatulate, 2-8 cm. long, becoming green above; inflorescence spicate; pappus united at base, and deciduous together from the hispid achene. Common.

2. **G. decurrens** Ives. Stout, 5-8 dm. high, annual or biennial, very leafy, corymbosely branched at the top and bearing cymulose disposed clusters of rather broad heads; leaves lanceolate, partly clasping, decurrent above; bracts yellowish-white, acutish; the inner linear-lanceolate, achene glabrous. Kootenay.

3. **G. Macounii** Greene. Rigidly erect, about 6 dm. high, rather loosely leafy and clothed with a somewhat hirsute and viscid-glandular pubescence; leaves narrowly oblanceolate, acute, 8 cm. long, the upper decurrent, all white-woolly beneath, light green and merely glandular-pubescent above branches of the sub-pyramidal close panicle and the main stem for some distance below it densely white-woolly, involucre of middle size, their pearly bracts all ovate, acute. Revelstoke; Chilliwack Valley.

4. **G. uliginosum** L. Diffusely branched, 0.5-2.5 dm. high, appressed woolly; leaves narrowly spatulate or linear; heads very small, in dense, terminal, leafy-bracted clusters. Common, Roadsides.

5. *G. palustre* Nutt. Low, 0.5-2 dm. high, loosely woolly, branching from the base, the branches ascending or erect, leaves narrowly spatulate or oblong; 1-2 cm. long; heads very small in dense, terminal, leafy-bracted, woolly clusters, bracts linear, brown with white tips, achenes glabrous. Low ground, V. I.; Kootenay.

6. *G. microcephalum* Nutt. White tomentose throughout, slender 3-8 dm. high; with slender branches above, leaves linear, 3-5 cm. long, slightly decurrent, heads yellowish-white or white, in a long, open inflorescence; bracts ovate, acute. Dry fields, V. I. and east of Cascades.

7. *G. chilense* Spring. Rather stouter, 3-6 dm. high, with stout branches above, densely tomentose throughout; leaves oblong to linear, broad based, somewhat auricled; flower clusters terminal, involucre bracts white or yellowish, oval-oblong, obtuse. Coast to Rockies.

50. ARCTIUM (BURDOCK)

Coarse perennials with broad leaves; heads large; involucre globose, with hooked bracts; receptacle bristly; flowers purple or white, all perfect; filaments glabrous, distinct; pappus of short, rough bristles. (Greek *arktos*, a bear, an allusion to the rough bur).

1. *A. Lappa* L. (GREAT B.) Heads sub-corymbose, 3-5 cm. broad, mostly on long peduncles; involucre glabrous; leaves white-tomentose beneath. Introd. New Westminster; not so common at the Coast as the next.

2. *A. minus* Bernh. (COMMON B.) Heads racemose on the branches, 1.5-3 cm. broad, on short peduncles; involucre glabrous or arachnoid; leaves slightly less tomentose beneath. Introd.; Common.

51. SAUSSUREA (SAW-WORT)

Perennials with large heads of purplish flowers which are all perfect; bracts of involucre not appendaged; receptacle bristly; corolla tube inflated, 5-cleft; filaments glabrous, anther-tails ciliate; pappus double. (de Saussure was a Swiss botanist).

1. *S. densa* (Hook.) Rydb. Nearly smooth below, 1-3 dm. high; leaves oblong-lanceolate, acuminate, sinuate dentate or entire; heads several in a compact corymb; involucre 2 cm. high; bracts acuminate, nearly equal. Mt. Benson, V. I.; Rockies; Lake Louise.

52. CENTAUREA (STAR THISTLE)

Annual or perennial; flowers all tubular, the margined often much enlarged, lobed, and sterile; receptacle bristly; achenes flattish or 4-angled, involucre bracts margined or bristle-tipped. Introduced herbs, 3-6 dm. high.

Involucre bracts tipped with a spine.

Leaves prickly

Leaves not prickly

Involucre bracts not spine-tipped.

Pappus bristles about as long as the achene, annual

Pappus none, or short, perennial

1. *C. Calcitrapa*.

2. *C. melitensis*.

3. *C. Cyanus*.

4. *C. Jacea*.

1. *C. Calcitrapa* L. (STAR THISTLE). Stems wingless; heads sessile, all but the upper bracts tipped with a yellow spine which is solitary, naked or with smaller ones at its base; corolla purplish. Nanaimo.

2. *C. melitensis* L. (TICALOTE). Stems winged; heads subsessile or short-peduncled, middle and lower involucre bracts tipped with a purplish spine, 6-9 mm. long; corolla yellow. Nanaimo; Esquimalt.

3. *C. Cyanus* L. (CORN FLOWER, BACHELOR'S BUTTON). Tomentose when young; involucre bracts greenish-yellow, or with darker margins, fimbriate with scarios teeth; flowers blue, purplish or white, the marginal ones lobed. A common garden escape.

4. **C. Jacea** L. Involucral bracts brown, or with brown backs, the outer fimbriate, the middle lacerate, the inner entire or nearly so, marginal flowers rose-purple, the large limb deeply lobed. Victoria.

53. SILYBUM (MILK THISTLE)

Thistle-like; involucral bracts long and stout, very strongly spine-tipped; receptacle setose; pappus of flattish barbellate bristles united at base. (An ancient Greek name).

1. **S. Marianum** (L.) Gærtn. (LADY'S T.) Stout, nearly glabrous, annual or biennial; leaves mottled, broad, prickly, clasping. Introd.; Nanaimo.

54. CARDUUS (THISTLE)

Mostly biennial; prickly; flowers usually purplish, sometimes whitish, all tubular, perfect; bracts of involucre bristle-pointed; achenes oblong, flattish; pappus of numerous bristles united at base, plumose to the middle, deciduous. (The Latin name).

- | | |
|---|----------------------------|
| Perennial, heads small, 2 cm. high or less | 1. <i>C. arvensis</i> . |
| Biennial, heads larger. | |
| All the involucral bracts spine-tipped, leaves markedly decurrent . | 2. <i>C. lanceolatus</i> . |
| The inner involucral bracts unarmed. | |
| Involucral bracts with a dark glandular spot on the back; | |
| plants white-tomentose | 3. <i>C. undulatus</i> . |
| Involucral bracts not at all glandular, leaves green, at least | |
| above. | |
| Tips of inner bracts dilated or twisted | 4. <i>C. foliosus</i> . |
| Tips of inner bracts not dilated or twisted. | |
| Involucre not conspicuously woolly, flowers pale | 5. <i>C. Drummondii</i> . |
| Involucre conspicuously woolly. | |
| Flowers red | 6. <i>C. edulis</i> . |
| Flowers pale | 7. <i>C. Hookerianus</i> . |

1. **C. arvensis** (L.) Scop. (CANADA T.) Perennial, from rootstocks; leaves oblong-lanceolate, glabrous or slightly woolly beneath, sinuate-pinnatifid; heads imperfectly dioecious, about 2 cm. high, corymbose. Introd. widely; Lulu Is.

2. **C. lanceolatus** L. (COMMON THISTLE). Stem woolly, leaves deeply pinnatifid, strongly prickly, the bases long-decurrent on the stem, rough above, woolly beneath; all the involucral bracts prickly, the outer successively shorter. Introd. widely.

3. **C. undulatus** Nutt. (WOOLLY T.) White-tomentose, leaves rather deeply pinnatifid below, merely undulate above, with strong prickles; bracts of involucre with a blackish glandular spot on the back; heads solitary at ends of branches; corollas rose to white, the lobes equaling the throat. Dry plains east of Cascades.

4. **C. foliosus** Hook. Somewhat woolly, 3-4 dm. high; heads clustered; at least the terminal 3-4 cm. wide, leaves linear-lanceolate, laciniately dentate with rather rigid prickles, woolly beneath; involucral bracts thin-coriaceous, some of the inner with conspicuous erose scarious tips; corollas pale, lobes equaling or longer than the throat. Rockies.

5. **C. Drummondii** (T. & G.) Cov. Stem simple, 6-9 dm. high or less, more or less woolly with axillary or clustered heads; leaves deeply sinuate, pinnatifid to nearly entire, somewhat woolly, especially beneath; bracts of involucre chartaceous, arachnoid on the margins, the inner with weak scarious, acute or erose tips, the outer broad-based, shorter with a stiff bristle 3 mm. long; corollas white, the lobes shorter than the throat; pappus slightly broader at tip. Rockies. Var. **acaulescens** Cov. Almost or quite stemless, the heads congested. With the species.

6. **C. edulis** Greene. (EDIBLE THISTLE). Stem lightly pubescent-arachnoid, 1-2 m. high; leaves green above, white-tomentose beneath, slightly to deeply sinuate-pinnatifid, weakly prickly; heads scattered or clustered;

involucres arachnoid, at least when young, the bracts lanceolate, loose, acuminate; corollas usually purple, sometimes whitish, the lobes a little shorter than the throat; pappus slightly tawny. Common west of the Cascades; also in Okanagan. The roots were eaten by the Indians.

7. *C. Hookerianus* (Nutt.) Heller. Stems 6-12 dm. high, more or less cobwebby-woolly; leaves pinnatifid, moderately prickly, green but somewhat floccose above, cottony beneath; heads mostly leafy-bracted, sessile and clustered above, peduncled below, bracts not so clearly successively shorter as in *C. Drummondii*, their rather stiff prickles 4-5 mm. long, all but the innermost bristle-tipped. Rockies; Field; Golden.

55. ONOPORDUM (SCOTCH THISTLE)

Stems broadly winged by the decurrent leaves; receptacle deeply honey-combed, not setose; pappus not plumose; otherwise as *Carduus*. (The ancient name).

1. *O. Acanthium* L. Stems (1-2 m. high) and broad, prickly leaves tomentose; bracts of the involucre narrow, all prickly; flowers purple. Introd. Nanaimo.

56. LAPSANA (NIPPLEWORT)

Tall, erect, branching annuals with loosely paniced yellow heads 8-10 mm. broad, 8-12-flowered; involucre bracts 8, with a short, outer series; receptacle naked, pappus none. (Greek name of some plant).

1. *L. communis* L. Stem pubescent below, nearly smooth above; 3-9 dm. high; leaves ovate, often strikingly lyrate, with a more or less winged petiole; achenes obovate-oblong, flattish. Roadsides.

57. CICHORIUM (CHICORY)

Tall, erect, branching perennials with sessile heads of blue flowers; inner involucre bracts 8-10, outer shorter, 5; pappus of numerous chaffy scales; receptacle naked or minutely fringed. (Arabian name).

1. *C. Intybus* L. (BLUE SAILORS). Stem leaves lanceolate, clasping, the lowest runcinate. Introd.

58. MICROSERIS

Low, glabrous, scapose herbs with solitary yellow heads; involucre bracts in about 2 series, green, scarious-margined; pappus of scales tapering into bristles.

1. *M. Bigelovii* Gray. Slender, hardly 1 dm. high; leaves narrowly oblanceolate and entire or pinnatifid; involucre bracts few, subequal, 6 or 7 mm. long; paleæ of pappus about 5, the dilated base nearly equaling the scabrous bristle. Grassy places, Victoria.

2. *M. nutans* Gray. Slender, 1-3 dm. high; leaves entire and linear to pinnatifid; involucre with a few short basal bracts below the 8-10 linear-lanceolate ones; paleæ of the pappus about 15, the dilated base one-third as long as the plumose bristle. Columbia Valley; Arrowhead.

59. STEPHANOMERIA

Glabrous herbs with rigid stems; the cauline leaves small or scale-like; heads paniculate, solitary at the ends of the branches; corolla pinkish; involucre bracts few, scarious-margined, usually with small ones at base; achenes 5-ribbed, linear, terete; pappus plumose, receptacle naked.

1. *S. minor* Nutt. Radical leaves runcinate-pinnatifid; plant 3-5 dm. high; heads about 5-flowered. D. I.; Princeton.

60. HYPOCHÆRIS (CAT'S EAR)

Similar to *Leontodon*, but at least some of the achenes are produced into long beaks bearing the pappus at their summit; scapes simple or sometimes branching; receptacle chaffy. (An ancient name).

1. *H. radicata* L. Scape 2-4 dm. high; leaves hirsute, oblanceolate, pinnatifid or sinuate-dentate; heads 3 cm. broad; achenes all beaked. Common weed, roadsides and lawns.

2. *H. glabra* L. More slender, 1-2.5 dm. high; leaves glabrous, oblong-ovate, dentate; heads 2 cm. broad; the outer achenes not beaked. *Introd.*, V. I.; Nanaimo.

61. LEONTODON (FALL DANDELION)

Perennial, the scape often branching; heads solitary at the ends of the branches; involucre with small basal bracts; pappus brownish, plumose, flattened at base, achenes fusiform, striate, not beaked; receptacle not chaffy. (Greek *leon*, a lion, *odous*, a tooth, descriptive of the leaves).

1. *L. autumnalis* L. Scape simple or branching, scaly-bracteate above, the peduncles thickened at the summit; leaves toothed or pinnatifid, slightly pubescent; involucre glabrous or pubescent, pappus tawny, of equal bristles. *Introd.*; not common.

2. *L. hastilis* L. var. *vulgaris* Koch. Leaves, scapes and involucre hispid; scape simple, naked; pappus of 2 kinds, the outer of a few short setæ, the inner of plumose bristles with dilated bases. (*L. hispidum*). *Introd.*, Victoria.

62. TRAGOPOGON (GOAT'S BEARD)

Stout, glabrous biennials or perennials with long, narrow, grass-like leaves, and solitary many-flowered heads; involucre simple, of equal bracts, 5 cm. long; pappus tawny; achenes fusiform, long-beaked, rough below, 5-10 ribbed. Two introduced species. *T. porrifolius* L. (OYSTER PLANT). Flowers purple. Victoria. *T. pratensis* L. Flowers yellow. Spence's Bridge.

63. APARGIDIUM

Low; roots fusiform; heads yellow, solitary, scapose; involucre narrowly turbinate, its bracts in 2-3 series, receptacle naked; pappus tawny, of barbelate bristles. Slightly distinct from *Microseris* in the capillary pappus.

1. *A. boreale* T. & G. Scape 1.5-2 dm. high; leaves linear-lanceolate, entire or denticulate; involucre 1.5 cm. high. Alaska to Washington; Ucluelet.

64. TARAXACUM (DANDELION)

Heads many-flowered, solitary, on a hollow scape; involucre double, the outer or lower of short bracts, the inner of long bracts, in a single series; the alternate ones scarious-margined; achenes muriculate at the apex, and usually roughened on the 10 ribs; pappus with a beak, 1-3 times as long as the achene at maturity; leaves dentate to pinnatifid. After flowering, the scapes become decumbent, but are erect again when the fruit matures. (Greek *tarassein*, to disorder, in allusion to medicinal properties).

Fruit red 1. *T. erythrospermum*.
Fruit olive-green or light-brown.

Dwarf, less than 5 cm. high, outer bracts appressed 2. *T. scopolorum*
(v. also No. 9).

Taller.

Beak of pappus 2-3 times as long as the mature achene. 3. *T. officinale*.
Outer bracts strongly reflexed from base

Outer bracts appressed at base but with spreading or reflexed tips. 4. *T. dumetorum*.
Outer bracts pale, $\frac{3}{4}$ as long as the inner 5. *T. latilobum*.

Outer bracts green or dark green, shorter
Outer bracts erect, appressed.

Leaves with linear or narrowly falcate lobes, outer bracts $\frac{3}{4}$ as long as the inner 6. *T. lacerum*.
Leaves otherwise, outer bracts much shorter 7. *T. montanum*.

Beak of pappus less than twice as long as the mature achene
Slender, 1-1.5 dm. high; involucre dark green 8. *T. rupestre*.
Dwarf, 5-8 cm. high; involucre not dark green 9. *T. ovinum*.

1. **T. erythrospermum** Anderz. (RED-FRUITED D.) Similar to No. 3, with which it may be associated, rather smaller, leaves usually much cut, nearly to the midrib, the terminal lobe often small; heads 2-4 cm. broad, sulphur-yellow, the outer rays often purplish beneath; the outer involucre very glaucous, its bracts lanceolate, spreading, or somewhat recurved; pappus dirty white. Introd. Common at Field and Revelstoke; will doubtless become common at the Coast.

2. **T. scopulorum** (Gray) Rydb. (DWARF D.) A diminutive alpine plant; leaves and scape 5 cm. long or less; involucre 6-8 mm. high, few flowered; outer involucral bracts lanceolate, rather loose, the inner somewhat corniculate. Rockies.

3. **T. officinale** Weber. (COMMON D.) Scape and leaves more or less arachnoid; leaves dentate to coarsely pinnatifid and runcinate, the terminal lobe usually large; heads large, 3-5 cm. broad, orange-yellow; involucral bracts more or less glaucous, the outer elongated, lanceolate, conspicuously reflexed; the inner involucre reflexed at maturity; pappus whitish. Common. Introd.

4. **T. dumetorum** Greene. Large, the crown of the root or each of its branches bearing mostly one stout scape; the margins of the often large leaves not deeply, but very unevenly and laciniately cut; outer bracts in about 3 series, very large, pale, thin, before flowering almost equaling the inner, oblong-lanceolate, with dilated tips; the inner linear-lanceolate with dilated and corniculate bifid tips; achenes distinctly compressed, spinulose at apex, smooth or tuberculate below. Rockies to Assin.

5. **T. latilobum** DC. Often less than 1 dm. high; leaves runcinate, the lobes broadly triangular, the whole plant in western forms glabrous; involucral bracts not at all or only slightly corniculate, often dark livid-green, the outer widely reflexed; achenes sometimes muricate all over. Mt. summits, Coast to Rockies and northw.

6. **T. lacerum** Greene. Rather slender, scapes 1-1.5 dm. high, notably surpassing the leaves, flocculent, all other parts glabrous; leaves consisting of a linear rachis-like body and a few pairs of divaricate or retrorse linear or falcate lobes; outer bracts of involucre lanceolate, the tips dilated, the longest $\frac{3}{4}$ as long as the corniculate inner; achenes sharply spinulose at the very apex, the sides smooth; stipe of pappus only twice the length of the achene. Cañon of the Upper Liard.

7. **T. montanum** Nutt. Smooth or pubescent, the scapes 0.5-2 dm. high; leaves from denticulate to not very deeply lobed; the outer involucral bracts ovate, wholly appressed, not dark-green, $\frac{1}{2}$ as long as the inner or less; the inner corniculate. Rockies, on lower slopes; Crow's Nest Pass and northw.

8. **T. rupestre** Greene. Leaves narrowly oblanceolate, runcinate-toothed to runcinate-pinnatifid; involucre of very few bracts, the outer ovate, erect; the inner lance-linear, more or less corniculate; achenes notably cuneiform, truncate at prickly apex; stipe of pappus a trifle longer than the achene. Mt. Queest, alt. 6,000 ft.; Kicking Horse Lake.

9. **T. ovinum** Greene. Scape barely equaling the leaves, tomentose under the head, plants otherwise glabrous; leaves entire to dentate or usually runcinate-toothed; bracts of involucre few, all remarkably broad, the outer ovate with an abrupt, short, truncate apiculation, those of the inner that have scarious margins, ovate; achenes muricate at apex, the stipe of the pappus less than twice the length of the achene. Sheep Mt., Alberta.

65. AGOSERIS (FALSE DANDELION)

Stemless, heads solitary on long scapes, leaves entire or pinnatifid, involucral bracts imbricated in several series; achene ribbed, narrowing to a beak receptacle naked, pappus of white capillary bristles. (*Troximon*).

Margins of leaves not short-tomentose.

Beak of achene very short, nerved.

Leaves glaucous, glabrous or glabrate

Leaves villous-pubescent

Beak of achene slightly shorter to slightly longer than the body; perennials.

Outer bracts oblong or lanceolate, often obtuse

All the bracts linear and acute.

Beak of achenes $1\frac{1}{2}$ -2 times as long as the body.

Annual; heads less than 2 cm. high

Perennial; heads more than 2 cm. high

Margins of leaves short-tomentose.

1. *A. glauca*.

2. *A. villosum*.

3. *A. aurantiaca*.

4. *A. gracilentia*.

5. *A. heterophylla*.

6. *A. laciniata*.

7. *A. cuspidata*.

1. *A. glauca* (Pursh.) Greene. Scape 2-6 dm. high, glabrous or pubescent, tomentose under the head; leaves narrowly lanceolate or oblanceolate, glaucous, usually entire or dentate, sometimes pinnatifid, often tapering into margined petioles; throat of the corolla-tube strongly pilose; involucre glabrous or pubescent with the tips of the bracts glabrous; beak of the achene striate, much shorter than the body. (Includes var. *dasycephalum* T. & G.) Common east of the Cascades and in the mts. Var. *pumilum* (Nutt.) Nels. A low (1 dm. high) tufted form, usually with laciniate-toothed leaves; the outer bracts of the involucre the widest. Cascade Mts. and eastward. Var. *parviflora* (Gray). Glabrous; leaves 4-5 mm. wide, long-acuminate; involucre 12 mm. high. Kootenay.

2. *A. villosum* Rydb. About 1.5 dm. high; leaves oblanceolate, 1 dm. long, usually entire, permanently villous-pubescent; involucre more or less pubescent, the bracts ciliate, otherwise nearly glabrous above, the outer broadest, all more or less purple-spotted and purple-tipped. Rossland.

3. *A. aurantiaca* (Hook.) Greene. Nearly glabrous, more or less tomentose beneath the head, green, not glaucous; leaves narrowly lanceolate, usually acute, 1-2 dm. long; involucre glabrous above, the bracts oblong or lanceolate, often obtuse, more or less ciliate and purplish; flowers orange, drying brown or purple. (*A. carnea* Rydb. Flowers pink to flesh-color or purplish, Mt. Queest, may belong here). The beak of the achene about equaling the body; corolla-tube scarcely pilose. Cascade Mts. eastward. (*A. purpurea* (Gray). Bracts purple dotted; and *A. elata* (Nutt.) Greene. Flowers yellow, leaves densely pubescent; may occur in Kootenay).

4. *A. gracilentia* Greene. Similar; leaves lanceolate to linear, mostly entire; involucral bracts narrowly linear and acute; the beak of the achene a little longer than the body. (*T. gracilens* Gray).

5. *A. heterophylla* (T. & G.) Greene. Tufted scapes firm, slender, 1-3 dm. high, 3-4 times longer than the leaves; leaves pubescent, oblanceolate, entire, denticulate or sometimes pinnatifid, acute or obtuse; involucre imbricated, about 15 mm. long, the outer bracts nerved; achene including beak 11 mm. long, the latter one-half longer than the body. V. I.; Armstrong.

6. *A. laciniata* (Gray) Greene. Nearly glabrous except under the head or the leaves, sometimes slightly tomentose; scapes 3-6 dm. high; leaves usually deeply pinnatifid, the lobes often curving upwards; involucre glabrate to tomentose below, the bracts lanceolate, often purplish, imbricated; the beak twice as long as the body of the achene and longer than the pappus. V. I.; Boundary Bay. *A. grandiflora* (T. & G.) Greene, is distinguished by the large heads 3-3.5 cm. high, and larger achenes 2 cm. long, including the beak. V. I.; Spence's Bridge.

7. *A. cuspidata* (Pursh.) Scapes stout, larger than the linear, thick, crisp-wavy, tomentose-margined leaves, which taper from base to apex (grass-like); involucre glabrous, 2 cm. high; pappus of 15 or more barbellate bristles which slightly widen towards the base. (*Nothocalais cuspidata* Greene) Summerland; Kootenay.

66. *SONCHUS* (SOW THISTLE)

Coarse, leafy-stemmed, mostly glaucous weeds; leaves soft-prickly; heads many-flowered, the involucre in several series, becoming tumid at the base; corolla yellow; achenes truncate; pappus of white capillary bristles.

Involucre glandular-pubescent, heads 3-5 cm. broad	1. <i>S. arvensis</i> .
Involucre not glandular; heads 2-2.5 cm. broad	
Achenes wrinkled transversely	2. <i>S. oleraceus</i> .
Achenes smooth	3. <i>S. asper</i> .

1. *S. arvensis* L. (FIELD S.) Perennial; leaves runcinate-pinnatifid to spinulose-denticulate, clasping; heads large, closing at night, flowers golden. Common.

2. *S. oleraceus* L. (COMMON S.) Annual, leaves runcinate-pinnatifid, clasping, very soft-prickly, the basal auricles acute; involucre pubescent when young, often somewhat glandular; flowers pale-yellow. Common.

3. *S. asper* (L.) Hill. (SPINY S.) Stem-leaves toothed, or more or less curled and lobed, more harshly prickly than the preceding, clasping at base, the auricles rounded; involucre glabrous; flowers yellow. Common.

67. *LACTUCA* (LETTUCE)

Tall, leafy-stemmed herbs; heads mostly many-flowered; involucre cylindrical, or in fruit conical; bracts in 2-3 series; achenes mostly long-beaked, the beak dilated at the insertion of the soft-bristly pappus. (*L. lac*, milk, in allusion to the milky juice).

Achenes very short-beaked, pappus brown	1. <i>L. spicata</i> .
Achenes long-beaked, pappus white.	
Leaves prickly	2. <i>L. scariola</i> .
Leaves not prickly.	
Flowers yellow	3. <i>L. canadensis</i> .
Flowers blue	4. <i>L. pulchella</i> .

1. *L. spicata* (Lam.) Hitch. (TALL L.) Biennial, nearly glabrous, 1-3 m. high; leaves large, runcinate-pinnatifid or coarsely toothed; heads in a large, compound panicle; flowers small, bluish or whitish; achenes flat, ribbed, contracted into a short, stout beak. A common weed.

2. *L. scariola* L. (PRICKLY L.) Stems and branches whitish, 6-9 dm. high; leaves sinuate-pinnatifid (or merely denticulate to entire in var. *integrata* T. & G.) Prickly on the margins and midribs; the blade of the leaf generally vertical; flowers small, yellow; panicle open with long branches; seeds olive, flat, ribbed, the beak longer than the body. Introd. throughout.

3. *L. canadensis* L. (WILD L.) Glabrous and glaucous, 1-3 m. tall; leaves large, pinnatifid, pale beneath; heads many in an elongated panicle; flowers small, pale yellow; achenes thin, white, the slender beak half as long as the body. Introd. east of the Cascades.

4. *L. pulchella* (Pursh.) D. C. (BLUE L.) Puberulent; stem simple, 6-9 dm. high; leaves linear-oblong, entire or the lower sometimes runcinate; flowers large, showy; heads corymbose; the beak of the flat achene shorter than the body. East of the Cascades.

68. *PRENANTHES* (RATTLESNAKE ROOT)

Leafy-stemmed herbs with spindle-shaped roots and nodding heads of whitish or pale purplish flowers; involucre cylindrical, of 5-14 linear bracts in 1 series, with small basal ones; pappus of copious rough bristles.

1. *P. alata* (Hook.) Gray. Nearly glabrous, 3-6 dm. high; leaves hastate-deltoid, 4-6 cm. broad, dentate, abruptly (or cuneately above) contracted to a winged petiole; heads few-15 paniced. Alaska to Oregon. Vancouver.

69. CREPIS (HAWK'S BEARD)

Perennials or annuals; leaves entire, toothed, or pinnatifid; involucre bracts in 1 series with smaller basal ones; often thickened on base or midrib; achenes tapering upwards; pappus white; receptacle naked or short fimbriate.

Achenes slightly dilated at the insertion of the pappus; plants about

1-1.5 dm. high, leaves mostly entire or repand.

From rootstocks, leaves mostly basal 1. *C. nana*.

From a tap-root, stems leafy 2. *C. elegans*.

Achenes not dilated at the insertion of the pappus; plants taller, leaves usually pinnatifid.

Foliage glabrous to slightly pubescent.

Leaves mainly basal 3. *C. runcinata*.

Stems leafy.

Heads medium, involucre 7-9 mm. high 4. *C. capillaris*.

Heads large, involucre 10-12 mm. high 5. *C. biennis*.

Foliage pubescent to tomentose or canescent.

Involucre glabrous, or glabrate, 5-7-flowered 8. *C. acuminata*.

Involucre canescent, flowers 8-30.

Involucres with some black hairs; principal bracts 8-12 6. *C. occidentalis*.

Involucres without black hairs; principal bracts 5-8. 7. *C. intermedia*.

1. *C. nana* Rich. In low, often stemless tufts, the short peduncles often springing from the base; glabrous; leaves orbicular-obovate to spatulate, entire, repand-dentate or lyrate, commonly equaling the short stems; involucre very dark green, cylindrical, of 8-10 smooth bracts, about 12 mm. high; achenes linear, hardly narrowing above, minutely roughened. Alaska southward in mts.; Rockies.

2. *C. elegans* Hook. Many-stemmed, glabrous, 1-2 dm. high; leaves entire or nearly so, the basal spatulate, the cauline lance-linear; heads smaller, achenes linear-fusiform, minutely scabrous on the ribs; involucre 8 mm. high, dark-green, glabrous. Rockies; Golden; northw.

3. *C. runcinata* T. & G. Stem 3-9 dm. high, glabrous or somewhat glandular-hispid, with 1-2 leaves or scapose; leaves lanceolate-oblong, entire, repand or runcinate-dentate, 5-15 cm. long; glabrous or hairy at base; heads loosely corymbose, 2 cm. broad; involucre pubescent-hirsute, 1 cm. high; achenes linear, smooth, slightly narrowed upwards. Damp soil, Revelstoke; Laggan.

4. *C. capillaris* (L.) Walle. Slightly pubescent annual, 3-8 dm. high, leaves oblanceolate, mostly laciniate-pinnatifid, with spreading or ascending segments, or merely dentate; the cauline sagittate-auriculate; achenes 10-nerved, slightly fusiform. Becoming a common weed.

5. *C. biennis* L. Slightly pubescent 6-8 dm. high; leaves runcinate-pinnatifid; heads large, 2-4 cm. broad, achenes 13-nerved, smooth, alternate above. Introd., Victoria.

6. *C. occidentalis* Nutt. Stems 1-2 dm. high, leafy, usually several, from the strong perennial root; pubescent leaves pinnatifid, pubescent, or the upper entire; involucre slightly tomentose with some stiff black hairs intermixed with the white tomentum, 11-14 mm. high, 10-30-flowered; achenes brown, smooth or indistinctly nerved, long-tapering. Mt. slopes; Spence's Bridge; Kamloops.

7. *C. intermedia* Gray. Rather slender, perennial, 3-8 dm. high; soft-pubescent to slightly tomentose or glabrate throughout, leaves pinnatifid, with a long, entire tip, a few on the stem, involucre tomentulose about 12 mm. high, 8-15-flowered; achenes black or dark-brown, distinctly 10-ribbed. Dry slopes, Spence's Bridge to Golden.

8. *C. acuminata* Nutt. Similar; the inflorescence nearly glabrous; involucre 10-12 mm. high, narrow, the outer bracts canescent, the inner, 5-8, glabrate, bright-green; flowers 5-10. Same range.

70. **HIERACIUM** (HAWKWEED)

Hispid perennials, often glandular in the inflorescence; stems usually leafy; leaves entire or denticulate; the chief involucrel bracts subequal or imbricated in 2-3 series, calyculate bracts at the base; achenes short, not beaked nor tapering upwards; pappus sordid, white to almost tawny; receptacle naked or fringed.

Flowers white	1. <i>H. albiflorum</i> .
Flowers yellow.	
Stems slender, few-leaved; heads small, involucre 8 mm. high.	
Involucre not at all glandular	2. <i>H. triste</i> .
Involucre somewhat glandular	3. <i>H. gracile</i> .
Stems stout, leafy.	
Involucrel bracts glabrate, in 2-3 series.	
Heads many, leaves broadly lanceolate	4. <i>H. canadense</i> .
Heads few, leaves narrowly lanceolate.	5. <i>H. umbellatum</i> .
Involucrel bracts in 1 series (or with some small basal ones), pubescent.	
Involucre more or less black-hairy	6. <i>H. cynoglossoides</i> .
Involucre plentifully clothed with long white hairs.	7. <i>H. Scouleri</i> .

1. ***H. albiflorum*** Hook. Stems, 5-9 dm. high, leafy and hirsute below, nearly naked and glabrous above leaves oblong, 2-4 cm. broad, tawny, pubescent, narrowing to a winged petiole, nearly entire; heads many in an ample panicle, involucre glabrous or nearly so. Common, Coast to Rockies.

2. ***H. triste*** Cham. Stems simple 1-3 dm. high, few-leaved, bearing solitary or 2-4 racemosely disposed small heads; basal leaves obovate or spatulate, entire, glabrate or sparsely hairy; heads 12 cm. high, livid, involucre and peduncles densely clothed with long, dark-brown or grayish soft wool. Northern.

3. ***H. gracile*** Hook. Stems 2-4 dm. high, slender, pubescent, naked or nearly so; leaves spatulate or oblong, glabrate, mostly obtuse, repand-denticulate, or entire; heads few, somewhat racemose, small; the involucre 5-7 mm. long, this and the peduncles black-glandular-hairy. Mts., V. I. to Rockies; Alaska.

4. ***H. canadense*** Mich. Tall, 5-9 dm. high, pubescent throughout, leaves lanceolate to oblong or oblanceolate; the lower tapering to the base, the upper broad-based, usually dentate on the lower half; involucre pubescent to glabrate; heads usually many in a rather broad panicle; pappus tawny. Okanagan Valley.

5. ***H. umbellatum*** L. Similar, not so tall, 3-5 dm. high; leaves narrowly sometimes broadly, lanceolate, entire or sparingly denticulate, all somewhat narrowed at base; heads few, subumbellate or corymbose. Cascades eastward. Revelstoke.

6. ***H. cynoglossoides*** Arvet. Stout, 3-6 dm. high, stems and leaves hirsute or sometimes nearly smooth; leaves entire, lanceolate, 1 dm. long or more, sessile or the lowest short-petioled; heads few to many, involucre about 1 cm. high, its bracts in about 1 series, glandular, black-hairy, sometimes stellate. Rossland; Okanagan.

7. ***H. Scouleri*** Hook. Stem and leaves hirsute, 4-6 dm. high, leaves oblanceolate acute or obtuse, 1 dm. long or more, the lower tapering to a petiole; heads paniced; involucre glandular beneath the dense long whitish hairs. Kootenay; Arrowhead.

GLOSSARY

A

- Abortive.** Defective or barren.
Acaulescent. Stemless, or the stem subterranean.
Accumbent (Cotyledon). The edges against the radicle.
Achene. A small, dry, 1-seeded, indehiscent fruit.
Acicular. Needle-shaped.
Acuminate. Tapering at apex.
Acute. Terminating in a sharp angle.
Adnate. United with, *e.g.*, calyx and ovary.
Adnate anther. Attached for its whole length to the filament.
Albumen. Nutritive material accompanying the embryo.
Alveolate. Honeycombed.
Ament. Catkin, a short, dense, scaly spike.
Androgynous (inflorescence). Having both staminate and pistillate flowers: of sedges, spikes staminate at apex, pistillate at base.
androus. Having stamens, *e.g.* polyandrous, with many stamens.
Angiosperm. A plant with seeds enclosed in an ovary.
Annual. Of one year's duration. **Winter Annual**, germinating one season and maturing the next season.
Annular. Ring-like.
Anterior. The side of the flower remote from the axis of the inflorescence.
Anther. The pollen-bearing cell or cells of the stamen.
Anthesis. Time of flowering.
Apetalous. Without petals.
Apiculate. Ending in a short point.
Apocarpous (pistil). With separate carpels, as in Buttercup.
Appressed (of leaves or hairs). Lying close against.
Arachnoid. With cobwebby hairs.
Arcuate. Slightly curved.
Aril. A growth about the hilum of a seed.
Aristate. Awned.
Armed. Having spines or prickles.
Articulate. Jointed.
Ascending. Curving upwards.
Attenuate. Tapering to a narrow point.
Auricle. An ear-shaped appendage.
Awl-shaped. Tapering from base to a slender apex.
Awn. Bristle.
Axil. The angle between stem and petiole or branch.
Axillary. Situated in an axil.
Axis. The central line of flowers, etc.

B

- Barbed.** Furnished with rigid, usually reflexed, sharp points.
Barbellate. Finely barbed.
Bearded. Furnished with a bunch of hairs; bearing an awn.
Berry. A fruit with fleshy pericarp in which the seeds are embedded.
Bi- or Bis- Two or twice; *e.g.*, **bidentate**, having 2 teeth; **bifid**, 2 cleft; **bilabiate**, 2-lipped.

- Bract.** A small modified leaf, subtending a flower or branch of an inflorescence; sometimes on stems.
Bracteate. With bracts.
Bractlet. A small or secondary bract.
Bud. A rudimentary branch or flower.
Bulb. A subterranean leaf-bud with fleshy coats or scales.
Bulbiferous. Bulb-bearing.
Bulbous. Like a bulb.

C

- Caducous.** Falling early.
Cæspitose. Tufted.
Calcarate. Having a spur.
Callosity. A firm, thickened part.
Callus. Callosity; in grasses a hard point at base of lemma.
Calyculate. Having bracts resembling a calyx.
Calyx. The outer floral envelope.
Campanulate. Bell-shaped.
Canescent. Hoary.
Capillary. Hair-like.
Capitate. In a dense head or cluster.
Capsule. A dry, dehiscent fruit of more than one carpel.
Carinate. Keeled.
Carpel. A simple pistil or one member of a compound pistil.
Caruncle. An appendage at the hilum of a seed.
Castaneous. Chestnut-colored; red-brown.
Catkin. Ament.
Caudate. Tailed.
Caudex. The woody perennial base of an annual stem.
Caulescent. Having a stem above the ground.
Cauline. Belonging to the stem.
Cæspitose. Tufted.
Chaff. A thin, dry scale.
Chartaceous. With the texture of paper or parchment.
Chlorophyll. The green coloring matter in the cells of plants.
Ciliate. Fringed with marginal hairs.
Ciliolate. Minutely ciliate.
Cinereous. Ash-colored.
Circinate. Coiled from the tip, as the frond of a young fern.
Circumscissile. Opening by a transverse circular line.
Clavate. Club-shaped; thickened upward.
Claw. The narrow base of some petals.
Cleft. Deeply lobed, especially sharply lobed; the depth of lobing is indicated by the order **lobed**, **cleft**, **parted**, **divided**.
Cleistogamous (flowers). Fertilized in the bud, which does not open.
Coalescent. Uniting.
Cohesion. The union of organs of like nature.
Commissure. The surface by which the carpels join, as in the **Umbelliferae**.
Comose. Furnished with a tuft of hairs.
Compound. Composed of two or more similar parts united into a whole; a pistil of two or more carpels; a leaf of separate leaflets.

Connate. United.
Connective. The part of the anther joining the cells.
Connivent. Coming together, but not uniting.
Convolute. Rolled up lengthwise.
Cordate. Heart-shaped, with the point upward.
Coriaceous. Leathery in texture.
Corm. A solid bulb.
Corniculate. With a small horn.
Corolla. The inner floral envelope composed of petals, distinct or united.
Corymb. A flat-topped or convex flower cluster; strictly a raceme with the lower pedicels lengthened.
Corymbose. Corymb-like.
Cotyledons. The leaves of the embryo.
Creeping (stems). Running along at or near the surface of the ground and rooting.
Crenate (leaf). With rounded teeth.
Crenulate. Finely or slightly crenate.
Crown. An appendage to a pistil near its base or on the throat of a corolla.
Cruciform. Cross-shaped.
Cucullate. Hooded.
Culm. The stem of grasses and sedges.
Cuneate. Wedge-shaped.
Cuspidate. Tipped with a rigid point.
Cyme. A flattish, determinate inflorescence, (the central flowers blooming first).
Cymose. Cyme-like.

D

Deciduous. Not persistent; falling.
Decomound. More than once divided.
Decumbent. Reclining, the summit ascending.
Decurrent (leaf). Extending down the stem.
Decussate. Alternating in pairs at right angles to each other.
Deflexed. Bent abruptly downward.
Dehiscent. Opening by valves or slits, of capsule and anthers.
Deltoid. Broadly triangular.
Dentate. Toothed, the teeth usually directed outward.
Denticulate. Minutely dentate.
Depressed. Flattened from above.
Di-, Dis. Two or twice.
Diadelphous. Having stamens in two sets.
Dichotomous. Forking by pairs.
Didymous. In pairs.
Didynamous. Having the stamens in two pairs of unequal length.
Diffuse. Widely spreading.
Digitate (leaflets). Radiating from the top of the petiole.
Diœcious. Unisexual; staminate and pistillate flowers on separate plants.
Discoid. Without ray-flowers.
Disk. A fleshy expansion of the receptacle. In the *Compositæ* the mass of tubular flowers.
Dissected. Cut or divided into segments.
Distinct. Not united; evident.
Divaricate. Widely divergent.
Divided. Lobed to the base.
Dorsal. Related to the back.
Drupe. A stone fruit.
Drupelet. A small drupe.

E

E- or Ex-. Without, *e.g.*, **eciliate**, without marginal hairs; **eglandular**, without glands.
Echinate. Armed with prickles.
Emarginate. Slightly notched.

Embryo. The rudimentary plantlet in the seed.
Endogenous. Growing throughout the substance of the stem, not by superficial layers.
Entire (leaves, etc.). Without teeth.
Ephemeral. Lasting a day.
Epigynous. Growing on the summit of the ovary.
Equitant. Astride; of leaves enfolding each other.
Erose. With an irregular, gnawed margin.
Exfoliating. Putting off in layers.
Exogenous. Growing by superficial layers.
Exserted. Projecting, as stamens from a corolla.
Extrorse. Facing outward.

F

Falcate. Scythe-shaped; curved.
Fascicle. A close bundle.
Fascicled, fasciculate. In close bundles.
Ferruginous. Rust color.
Fertile. Producing fruit; of the anther, producing pollen.
Fibrillose. With fine fibres.
Filament. The part of the stamen supporting the anther; any thread-like body.
Filiform. Thread-like.
Fimbriate. Fringed.
Flabelliform. Fan-shaped.
Flaccid. Weak.
Floccose. Clothed with flocks of wool.
Foliateous. Leaf-like in texture.
-foliate. Leaved.
-foliolate. Having leaflets.
Foliose. Bearing numerous leaves.
Follicle. A fruit consisting of one carpel dehiscing by the ventral suture.
Free. Not adnate.
Fruit. The ripened ovary and its adnate organs.
Fugaceous. Falling early.
Fulvous. Tawny.
Fuscous. Grayish-brown.
Fusiform. Spindle-shaped, swollen in the middle and tapering to each end.

G

Galea. The hooded portion of a perianth, *e.g.*, the upper lip of *Castilleja*.
Gamopetalous. Having the petals united.
Gamosepalous. Having the sepals united.
Geniculate. Bent abruptly, like a knee.
Gibbous. Protuberant on one side.
Glabrate. Somewhat glabrous, with few hairs.
Glabrous. Not hairy.
Gland. A secreting surface or structure; any appendage having the appearance of such an organ.
Glandular. Bearing glands, or secreting hairs.
Glaucous. Whitened; covered with white bloom.
Glomerate. Compactly clustered.
Glomerule. A small, dense cluster.
Glume. A chaff-like bract; in grasses the empty bracts at the base of the spikelet.
Gymnospermous. Bearing naked seeds, not enclosed in an ovary.
Gynandrous. Having the stamens borne upon the pistil, as in *Orchidacææ*.
Gynobase. An elevation of the receptacle bearing the carpels.
Gynœcium. Pistil.

H

- Habit.** The general appearance of a plant.
Habitat. The situation in which a plant grows.
Halberd-shaped. Hastate.
Hastate. With basal lobes projecting outward nearly at right angles.
Head. A dense cluster of sessile or nearly sessile flowers on a short axis or receptacle.
Herb. A plant with no woody stem above the ground.
Hermaphrodite. A perfect flower.
Heterogamous. With two kinds of flowers.
Hilum. The scar marking the point of attachment of a seed.
Hirsute. Coarsely pubescent.
Hirsutulous. Slightly hirsute.
Hispid. Beset with stiff hairs.
Hispidulous. Minutely hispid.
Homogamous. A cluster with flowers all of one kind.
Hyaline. Transparent.
Hybrid. A cross between two species.
Hypogynous. Situated on the receptacle beneath the ovary, and free from it and the calyx.

I

- Imbricate.** Overlapping either vertically or laterally.
Imperfect (flowers). Wanting either stamens or pistil.
Immersed. Growing under water.
Incised. Sharply cut.
Included. Not protruding or exerted.
Incumbent. With the back of a cotyledon lying against the radicle.
Indefinite. Inconstant in number, or very numerous (of stamens, etc.).
Indehiscent. Not opening (of seed-pods).
Indigenous. Native.
Indurated. Hardened.
Indusium. The covering of the fruit dots in Ferns.
Inferior (ovary). Adnate to the calyx.
Inflorescence. Flower cluster.
Internode. The portion of a stem between two nodes.
Interruptedly pinnate. Pinnate with small leaflets intermingled with larger ones.
Intramarginal. Within the margin.
Introduced. Coming from another region or country.
Introrse. Turned inward toward the axis.
Involucre. A secondary involucre, as in *Umbelliferae*.
Involucral. Belonging to an involucre.
Involucre. A circle of bracts, distinct or united, about a flower-head or a single flower.
Involute. Rolled inward.
Irregular (flower). Showing inequality in members of an organ.

K

- Keel.** A central ridge; the two anterior united petals in *Leguminosae*.

L

- Labiate.** Lipped.
Lacerate. Irregularly cleft.
Laciniate. Cut into narrow lobes.
Lamella. A flat plate.
Lanceolate. Several times longer than wide, and broadest above the base.
Lax. Loose.

- Leaflet.** A division of a compound leaf.
Legume. Fruit composed of one carpel dehiscent by both sutures.
Lemma. The lower of the two bracts enclosing the flower in grasses.
Lenticular. Shaped like a double-convex lens.
Ligule. The strap-shaped corolla in *Compositae*; the scarious transverse membrane at the summit of the sheath in grasses.
Limb. Border of a petal or corolla.
Linear. Long and narrow.
Lip. The divisions of a bilabiate corolla; the lower petal in *Orchidaceae* or violets.
Lobe. A segment of leaf or petal.
Loculicidal. Dehiscent by an opening in the dorsal suture from the cavity of an ovary cell.
Loment. A pod which separates transversely into joints.
Lyrate (leaf). Pinnatifid, with the terminal lobe largest.

M

- Macros pore.** The larger spores in *Selaginellaceae*, etc.
Marcescent. Withering, but persistent.
Membranaceous, membranous. Rather thin and soft.
Merica rp. One of the carpels of *Umbelliferae*.
-merous. Having parts, e.g., 4-merous, having 4 petals, 4 sepals, etc.
Microspore. The smaller spores in *Selaginellaceae*, etc.
Monodelphous. Stamens united by their filaments into a tube.
Monilliform. Resembling a string of beads.
Monocotyledonous. Having one cotyledon.
Monœcious. Having staminate and pistillate flowers on the same plant, but not in the same flower.
Mucro. A short, abrupt tip.
Mucronate. With a short, abrupt tip.
Multifid. Cleft into many lobes.
Muricate. Rough, with short, hard points.
Muriculate. Finely muricate.

N

- Nectary.** An organ secreting nectar.
Neutral. Without stamens or pistil.
Node. Point at which a leaf or whorl of leaves is produced.
Nodose. Knotty.
Nut. A hard, 1-seeded, indehiscent fruit.
Nutlet. A small nut.

O

- Ob.** Denoting inversion.
Obcompressed. Not compressed in the usual way.
Obconical. Inversely conical.
Obcordate. Inversely heart-shaped, the depression uppermost.
Ob lanceolate. Lanceolate, with the broadest part above the middle.
Oblique. With unequal sides.
Oblong. Longer than broad, with nearly parallel sides.
Obovate. Inversely ovate.
Obsolete. Not evident, rudimentary, or wanting.
Obtuse. Blunt or rounded at apex.
Ochroleucous. Yellowish-white.
Ocrea. A sheathing stipule, as a *Polygonaceae*.
Odd-pinnate. Pinnate and terminating in a leaflet.

Off-set. A short, rooting branch near the ground.
Oval. Broadly elliptical.
Ovary. The part of the pistil that contains the ovules.
Ovate. Egg-shaped (of a plane surface).
Ovoid. Egg-shaped (of a solid).
Ovule. An immature seed.

P

Palate. A projection in the throat of a corolla.
Palea, Palet. The upper bract which with the lemma incloses the grass flower.
Palmate (leaf). Radiately lobed, cleft, parted or divided.
Panicle. A loose, irregular, compound inflorescence with pedicellate flowers.
Panicked, paniculate. Borne in a panicle.
Papilionaceous. With a butterfly-like corolla of standard, wings and keel.
Papillose. Bearing minute, nipple-like projections.
Pappus. The modified calyx-limb in *Compositæ* forming a crown of bristles or chaff on the summit of the achene.
Parasitic. Growing on and nourished by another plant.
Parietal. Attached to the wall of the ovary.
Parted. Cleft nearly to the base.
Pectinate. With comb-like teeth.
Pedicel. The stalk of a single flower.
Pedicellate. Borne on a pedicel.
Peduncle. A primary flower-stalk, supporting a cluster or a single flower.
Pedunculate. Borne on a peduncle.
Peltate. Shield-shaped, the petiole attached near the centre of the blade.
Perennial. Lasting several years.
Perfect. Having both stamens and pistil.
Perfoliate. With the stem apparently passing through the leaf.
Perianth. The floral envelope, consisting of calyx and corolla.
Pericarp. The wall of the repressed ovary.
Perigynium. The sac which encloses the ovary in *Carex*.
Perigenous. Adnate to the perianth, and therefore around the ovary and not at its base.
Personate (corolla). Two-lipped, with the throat closed.
Petal. A division of the corolla.
Petaloid. Colored and resembling a petal.
Petiolate. Having a petiole.
Petiole. Leaf-stalk.
Phænogamous. Having flowers with stamens and carpels.
Phyllodium. (pl. -ia). A leaf reduced to a modified petiole.
Pilose. With soft, rather long hairs.
Pinna (pl. -æ). One of the primary divisions of a pinnately compound leaf or frond.
Pinnate. Compound, with the leaflets on each side of the common rachis or petiole.
Pinnately lobed, cleft, parted, divided. Cut somewhat at right angles to the axis to a depth indicated by this order.
Pinnule. A secondary pinna.
Pistil. The seed-bearing organ of the flower, composed of one or more carpels forming ovary, style and stigma.
Pistillate. Having a pistil but no stamens.
Placenta (pl. -æ). The part of the ovary bearing the ovules.
Plicate. Folded.
Plumose. Having fine hairs on each side of a pappus bristle; feathery.

Pod. Any dry, dehiscent fruit.
Pollen. The fertilizing grains in the anther.
Poly-. Many.
Polygamous. With both perfect and imperfect flowers.
Polypetalous. Having separate petals.
Pome. A fleshy fruit, like an apple.
Posterior. The side of the flower next the axis.
Prickle. A small, stiff outgrowth of the bark.
Prismatic. Angular, with flat sides.
Procumbent. Lying on the ground, but not rooting.
Proliferous. Producing offshoots.
Prostrate. Lying flat on the ground.
Puberulent. Minutely pubescent.
Pubescent. Covered with hairs, especially if short and soft.
Punctate. Dotted with depressions or translucent glands or spots.
Pungent. Terminating in a sharp point.
Pyriform. Pear-shaped.

R

Raceme. A simple indeterminate inflorescence of pediceled flowers on a more or less elongated axis.
Radical. Springing from the root or the very base of the stem near the ground.
Radicle. The portion of the embryo below the cotyledons; more properly the caudicle.
Ray. Branch of an umbel or grass panicle; the marginal flowers in *Compositæ*.
Receptacle. The more or less expanded summit of an axis which bears the floral organs.
Recurved. Curved outward or backward.
Reflexed. Bent outward or backward.
Regular. The parts uniform.
Reniform. Kidney-shaped.
Repend. With a slightly uneven and somewhat sinuate margin.
Reticulate. Net-veined.
Retorse. Directed back or downward.
Retuse. With a shallow notch at the rounded apex.
Revolute. Rolled backward from the margin.
Rachilla. A secondary axis; in grasses and sedges the floral axis as opposed to that of the spikelet.
Rachis. The axis of a spike or of a compound leaf.
Rhizome. Rootstock.
Rootstock. An underground stem.
Rosulate. In the form of a rosette.
Rotate. Wheel-shaped; flat and circular.
Rufous. Reddish-brown.
Rugose. Wrinkled.
Runcinate. Having the segments of the leaf directed backward.
Runner. A slender, prostrate branch rooting at the nodes; a slender stolon.

S

Sac. A deep cavity.
Saccate. Sac-shaped.
Sagittate. Arrow-shaped, the basal lobes directed downward.
Salver-shaped. With a short tube and a broad, abruptly expanded limb.
Samara. An indehiscent, winged fruit.
Scabrous. Rough to the touch.
Scape. A peduncle rising from the ground, naked or with bracts, but without proper foliage.

Scapose. Resembling a scape.
Scarious. Thin and dry, not green.
Scorpioid. Coiled from the end.
Secund. One-sided.
Sepal. A division of the calyx.
Septicidal. Of a capsule opening along the partitions.
Septum. A partition.
Serrate. Having sharp teeth pointing forward.
Serrulate. Finely serrate.
Sessile. Without pedicel, peduncle, or petiole.
Seta. A bristle.
Setaceous. Bristle-like.
Sheath. A tubular envelope, as the lower part of the leaf in grasses.
Shrub. A small, woody perennial, often with several stems.
Silicle. A short silique.
Silique. The pod of *Cruciferae*.
Simple. In one piece, not compound.
Sinuate. Wavy.
Sinus. The cleft between two lobes.
Smooth. Not pubescent.
Sorus. The fruit-dot of Ferns.
Spadix. A fleshy spike.
Spathe. A large bract or pair of bracts inclosing an inflorescence.
Spatulate. Gradually narrowed downward from a rounded summit.
Spicate. Resembling a spike.
Spike. An indeterminate inflorescence with the flowers sessile or nearly so on an elongated axis.
Spindle-shaped. Swollen in the middle and tapering at both ends.
Spine. A sharp, woody outgrowth of the stem.
Spinose. Having spines, spine-like.
Sporangium. A spore case.
Spore. The reproductive organ in *Cryptogams* corresponding to a seed, but without an embryo.
Spur. A tubular expansion of sepal or petal, usually nectariferous.
Squarrose. Spreading or recurved (of bracts).
Stamen. The pollen-bearing organ.
Staminode. A sterile stamen, a stamen reduced to a filament.
Standard. The upper petal in *Leguminosae*.
Stellate. Starlike (of branching hairs).
Sterile. Barren; as a flower without pistil.
Stigma. The part of the pistil receptive to the pollen.
Stipe. The stalk-like support of a pistil; the leaf-stalk of a Fern.
Stipitate. Having a stipe.
Stipular. Belonging to stipules.
Stipulate. Having stipules.
Stipule. An appendage at the base of the petiole.
Stolon. A basal branch disposed to root.
Stoloniferous. Producing stolons.
Stoma (pl. stomata). An opening in the epidermis of the leaf or stem communicating with internal air-cavities.
Stramineous. Straw-colored.
Striate. Marked with fine, longitudinal lines.
Strict. Straight and erect; narrow.
Strigose. Beset with sharp, stiff hairs.
Style. The part of the pistil between the ovary and the stigma.
Stylopodium. A disk-like expansion at the base of a style, as in *Umbelliferae*.
Sub-. Somewhat, slightly, nearly, *e.g.*, *subcordate*, slightly cordate.
Subulate. Awl-shaped.
Succulent. Juicy.

Suffrutescent. Slightly shrubby.
Sulcate. Grooved.
Superior (ovary). Free from the calyx.
Surculose. Producing suckers.
Suture. Line of dehiscence; line of juncture.
Symmetrical (flower). Regular in the number of its parts; having the same number of parts in each circle.
Syngenesious (stamens). United by their anther.

T

Tawny. Dull yellow.
Tendril. A threadlike process used for climbing.
Terete. Having a circular, transverse section.
Ternate. In threes, or the divisions in threes.
Tetradynamous. Having 4 long and 2 short stamens.
Tetragonal. Four-angled.
Throat. The top of the tube in a gamopetalous corolla.
Thyrse, Thyrsus. An ovoid, pyramidal or cylindrical compact panicle.
Tomentose. Clothed with matted hairs.
Torulose. Cylindrical with contractions at intervals.
Tri- Three. Trifid. Three-cleft.
Trigonous. Three-angled.
Triquetrous. Three-angled, the sides concave.
Truncate. Cut off abruptly.
Tuber. A thickened, short, subterranean stem with buds or eyes.
Tubercle. A small excrescence.
Tuberous. Having small swellings or excrescences.
Turbinate. Top-shaped, inversely conical.
Turgid. Swollen.

U

Umbel. An inflorescence in which the peduncles or pedicels spring from the same point.
Umbellate. Like an umbel.
Unarmed. Without spurs or prickles.
Undulate. Wavy.
Uni. One; unisexual, having one kind of sex organs.
Urceolate. Urn-like.
Utricle. A small, bladder, 1-seeded fruit; a small bladder-like body.

V

Vallecular. Near a groove.
Valvate. Opening by valves.
Valve. One of the parts into which a capsule splits.
Vascular. Furnished with vessels or ducts.
Veins. Fibro-vascular threads in a leaf or other organ.
Ventral. Opposite of dorsal; belonging to the anterior face.
Vernation. The arrangement of leaves in the bud.
Versatile (anther). Attached near the middle.
Verticel. A whorl.
Verticillate. Arranged in a whorl.
Vesicle. A small bladder.
Villous. Bearing long, soft hairs.
Virgate. Wand-shaped; straight and slender.
Viscid. Sticky.

W

Whorl. A circle of leaves at a node.
Wing. A thin, membranous expansion.

ADDENDA

On page 23, after *Agrostis atrata*, insert:—

A. Thurberiana Hitchc. Tufted, 2-5 dm. high, ligule 5-6 mm. long; panicle narrow, nodding, 5-15 cm. long, spikelets 2-3 mm. long; glumes purplish, obtuse; palea nearly as long; prolonged rachilla short. Prince Rupert; Wyoming.

On page 40, after *Poa Lettermanni*, insert:—

P. vaseychloa Scribn. Tufted, 1.5 dm. high, leaves involute, narrow, smooth; panicle 2-4 cm. long, narrow (at flowering); purplish; spikelets 2-4 flowered, 4-6 mm. long; glumes broad; lemmas strongly nerved, scabrous. Victoria; Oregon.

On page 45, after *Melica aristata*, insert:—

M. purpurascens (Torr.) Hitchc. Glabrous throughout; leaves roughish; panicle narrow; glumes purple; lemmas usually purple, smooth, glabrous except for ring of hairs at base; usually purplish; awn 10-13 mm. long. Common about Hazelton.

On page 48, after *Agropyron repens*, insert:—

A. caesium Presl. Like *A. repens*, from which it may not be distinct; but with lemmas indistinctly nerved, and awns 6-10 mm. long. Well established near Victoria. (Plants determined by Mrs. Chase).

On page 63, after *Carex rigida*, insert:—

C. interrupta Boeckl. Stems 3 dm. high, slender, sharply angled above; leaves rough, usually exceeding the stem, about 4 mm. broad, bracts shorter than the inflorescence; pistillate spikes 3-5, 12-40 mm. long, about 4 mm. thick, interrupted at base, sessile or the lower one short-peduncled; scales brown, with a pale midrib and margin, nearly as long as the perigynia, broadly lanceolate, acute, appressed; perigynia small, green, elliptical, short-beaked. Gravel, Duncan; Oregon. The Duncan plant has rather spreading scales, a little longer than the grayish, almost reticulated, nearly nerveless perigynia.

On page 66, after *Carex leptalea*, insert:—

C. circinata Meyer. Tufted; culms slender, rough, 1.5-2 dm. high, slightly exceeding the leaves; leaves narrow, sub-triquetrous, channelled, very rough on the margin, more or less circinate curving; spikes solitary, 12-25 mm. long, 8-10 male flowers at apex, 8-12 female below; scales oblong, obtuse, reddish; perigynia yellow, 3-nerved, erect, oblong-lanceolate, narrowed at both ends, the margins inflexed and hispid, orifice truncate, surpassing the scale; stigmas 2 or 3. Among rocks; Unalaschka; Olympic Mts., Wn. (Piper). *C. leptalea* has straight, narrower leaves, and blunter perigynia.

C. anthoxantha Presl. Stems solitary, slender, 2 dm. high, exceeding the leaves; leaves 1.5-2 mm. wide; spikes reddish-brown, 2 cm. long, cylindrical or clavate, 3 mm. thick; perigynia green, striate, lanceolate, entire, a little longer than the obtuse or cuspidate brownish scales. Q. C. Is. to Alaska; Swamps, Prince Rupert.

On page 69, after *Carex misandra*, insert:—

C. macrochaeta Meyer. Tufted; culms 3-4.5 dm. high, rough on angles; leaves 2-5 mm. wide, smooth except on margins, the longest equaling the culm, a pair sometimes apparently opposite; bracts leafy, not sheathing, the lowest exceeding the culm; male spike peduncled; female spikes 2, oblong or sub-ovate, distant, the upper subsessile, erect, the lower nodding, on a peduncle 12-37 mm. long, all three 12-37 mm. long; scales oblong, acute at both ends,

entire, nerves obsolete, yellow at base, black at apex, smooth, 2-4 mm. long, not exceeding the tip of the scale; stigmas 3, rarely 2; allied to *C. salina*, but with fewer spikes and 3 stigmas. Unalashka; Mts., Chilliwack River.

On page 70, after *C. rostrata*, insert:—

A form of this species with drooping pistillate spikes, very rare in America, occurs at Burnaby Lake. (Spec. det. by Mr. K. K. MacKenzie).

On page 98, after *Salix Scouleriana*, insert:—

S. alaxensis (Anders) Coville. Shrub or small tree, 1-9 m. high; twigs stout, smooth or hairy, often with bluish bloom; leaves oblanceolate to elliptical-lanceolate, entire, acute at both ends, glabrous above, densely clothed beneath with a very white tomentum of curled hairs, 4-14 cm. long; stipules linear; fertile catkins sessile, reaching 10 or even 14 cm. in length, and a diameter of 1.8 cm.; capsule tomentose, stigmas linear, nearly $\frac{1}{2}$ as long as the long style. Alaska; Northern Rockies; Metlakahtla, where possibly introd.

On page 115, after *Atriplex*, insert:—

SARCOBATUS (GREASEWOOD)

Subspinescent shrubs with alternate fleshy leaves, and small green bractless monœcious or diœcious flowers; staminate flowers without calyx; in close terminal spikes, stamens 2-5, irregularly arranged under a stipitate peltate scale; pistillate flowers solitary, axillary, the fruiting calyx with a broad, horizontal lateral wing; embryo spiral, with little or no albumen. (Gk. *sarkos*, flesh, *batos*, a bramble; the leaves are fleshy and the stem thorny).

S. vermiculatus (Hook) Torr. Stems 5-25 dm. high, with smooth white bark; leaves linear, entire, 1.5-5 cm. long; lateral wing of calyx 7-12 mm. broad. Moist saline flats; Sask. to Wn.; southern Okanagan.

On page 130, after *Anemone narcissiflora*, insert:—

A. Richardsonii Hook. Slender, 8-20 cm. high, from long rootstocks; pubescent; basal leaves round-reniform, 3-lobed, the lobes broadly obovate, dentate or crenate; involucrel leaves sessile, similar; flower solitary; sepals usually 6, about 1 cm. long, yellow (or white?), oblong-elliptical; achenes glabrous or nearly so, with a hooked style. Alaska southward in mts. to the Skeena; Roche de Boule Mts.

On page 175, in the descr. of *R. Engelmannii*, for "leaflets thin, coarsely," read "leaflets thin, sharply."

On page 193, after *Oxytropis monticola*, insert:—

O. villosus (Rydb.) Tufted, 1-3 dm. high; pubescence silky-villous, more or less appressed; leaflets lanceolate, acute, 11-25, 10-15 mm. long; inflorescence dense, 1.5-3 cm. long; corolla yellowish, about 1.5 cm. long; calyx densely short-hirsute with black and white hairs intermingled, the teeth short, lanceolate; pod about twice as long as the calyx. Skeena to Col. Distinguished from *O. monticola* by the smaller, lanceolate, more acute leaflets; and by the shorter pod.

On page 229, after *Vaccinium uliginosum*, insert:—

V. occidentale Gray. Glabrous shrub, 3-9 dm. high; leaves rather thin, entire, glaucescent, obscurely veiny, oval to obovate-oblong or oblanceolate, obtuse or acutish, 12-18 mm. long; flowers mostly solitary, 4-merous; corolla oblong-ovoid; berries dark blue, small, 4-6 mm. in diameter. Mt. Mark, V.I.; Wn. Distinguished from *V. uliginosum* by the thinner, obscurely veiny leaves.

The last line page 225 should read:—"petals 0; the 5 stamens alternate with the soon-deflexed sepals; style very short;" etc.

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Synonyms and names of plants merely mentioned are in *italics*.

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